ESSENTIAL SKILLS
FOR UNDERGRADUATES

Prof. Aamer Zaman Khan

SKILLS LAB

Department of Medical Education & Educational Research
Fatima Jinnah Medical University, Lahore

This book is dedicated to all surgical students, young or old; to all the teachers who make their students practice not until they can get it right but until they cannot get it wrong; to those who are willing to impart their knowledge and to those who are impatient to receive it.

FOREWORD

PROF. SARDAR FAKHAR IMAM

I believe that we learn by practice whether it means to learn surgical skills by practicing them or to learn to live by practicing living, the principle is the same. In each, it is a performance of a dedicated precise set of acts, physical or intellectual, from which comes shape of achievement, a satisfaction of spirit. Practice is a means of inviting the perfection desired.

I believe, this book is the perfect introduction to the art of surgical skills. The diligence and effort put into this book to bring forth very complicated topics as simple and understandable is indeed commendable.

The most important asset is time and thence, a book that teaches you a lot in a small amount of time is indeed a treasure for the students. I believe that for the things we have to learn before we can do them, we learn by doing them. This book is the perfect example of that.

Happy reading, my dear future doctors!

PREFACE

PROF. AAMER ZAMAN KHAN

Skills enhancement in medical students need to be completed within a defined scope, time and cost constraints. In addition to these challenges, it requires general management, technical and interpersonal skills for achieving the objectives. In order to succeed in this challenging arena, medical students have to be continually on the learning curve. It involves a number of processes and sub-processes such as Identifying Inputs, Planning & Scheduling, Budgeting, Implementation, Monitoring, Recording Gaps and Improving.

This book aims to help medical students to imbibe these skills and deliver. This book is written for a wide audience. Readers will find the concepts and techniques written in enough detail to be immediately useful. Practicing doctors will find the text to be a valuable guide and reference when dealing with problems that arise in the course of clinical practice.

Doctors at all levels and of all streams will find the text useful not only in providing them with a rationale for the techniques but also because of the insights they will gain on how to enhance their skills.

The book has been divided into 16 chapters which have been organized in a manner to ensure learning and Skills acquisition.

This book is a sincere and humble effort in the direction of helping all those individuals who want to advance their career for the better future. I shall be grateful and sincerely invite suggestions & feedback for the further improvement of this book.

Acknowledgements

I have received much help from several sources and gladly acknowledge my debt to many friends and colleagues. I was fortunate enough to call upon a number of people to fill the remaining gaps in this publication.

I express heartfelt gratitude to our wellwishers for their encouragement and guidance in the preparation of this handbook. Our special thanks are due to our contributors who spared no efforts in making this handbook a reality.

I express heartfelt gratitude to Dr. Anum Kabir for her contribution in preparation of this handbook. The exceptional contributions from Prof. Sardar Fakhar Imam, Dr Roeya E Rasul, Dr Salman Majeed Chaudhry, Dr Anum Anser and Dr Sumbal Jami are worth mentioning.

I am grateful for their hard work and willing co operation.

To those whose names might have been inadvertently missed, I offer my apologies and hope they will be consoled by the fact that their knowledge and experience is being passed onto others.

Prof. Aamer Zaman Khan

6th January, 2016

List of Contributors

PROF. AAMER ZAMAN KHAN
Pro-Vice Chancellor
Chair-Person Surgery,
FJMU, Lahore

PROF. SARDAR FAKHAR IMAM
Vice Chancellor,
Chair-Person Medicine,
FJMU, Lahore

PROF. TAHIRA MURTAZA CHEEMA
Professor of Medicine,
FJMU, Lahore

PROF. HAMID BUTT
Principal,
SIMS, Lahore

PROF. KHALID MASOOD GONDAL
Chair-Person Surgery,
KEMU, Lahore

PROF. MANZOOR AHMED
Chair- Person,
ENT,
FJMU, Lahore

PROF. KAMRAN KHALID KHAWAJA
Professor of Surgery,
FJMU, Lahore

PROF. MARIAM MALIK
Chair- Person,
Gynae & Obs,
FJMU,Lahore

PROF. MAHMOOD AYYAZ
Professor of Surgery,
SIMS,Lahore

PROF. KHALID JAVED
Chair- Person,
Anaesthesiology,
FJMU, Lahore

PROF. SYED ASGHAR NAQI
Professor of Surgery,
KEMU,Lahore

PROF. ABRAR ASHRAF ALI
Professor of Surgery,
KEMU, Lahore

PROF. FARRUKH KAMAL
Chair- Person,
Pathology,
FJMU,Lahore

DR. BASMA KHAN
Associate Professor,
Deptt. of Radiology,
FJMU, Lahore

List of Contributors

PROF. YAWAR SAEED
Chair- Person,
Orthopedics,
FJMU,Lahore

DR. SHABBIR CHOHAN
Assistant Professor,
Surgery,
FJMU,Lahore

DR. ANUM KABIR
Deptt. of Surgery,
SGRH, Lahore

DR. ROEYA E RASUL
Focal Person, DME,
FJMU, Lahore

DR. SALMAN MAJEED
CHAUDHRY
Deptt. of Surgery,
SGRH, Lahore

DR. ANUM ANSER
Deptt. of Surgery,
SGRH, Lahore

DR. SUMBAL JAMI
Deptt. of Surgery,
SGRH, Lahore

CONTENTS

CONTENTS

SESSION 1

BASIC LIFE SUPPORT

Summary of High-Quality CPR Components for BLS Providers

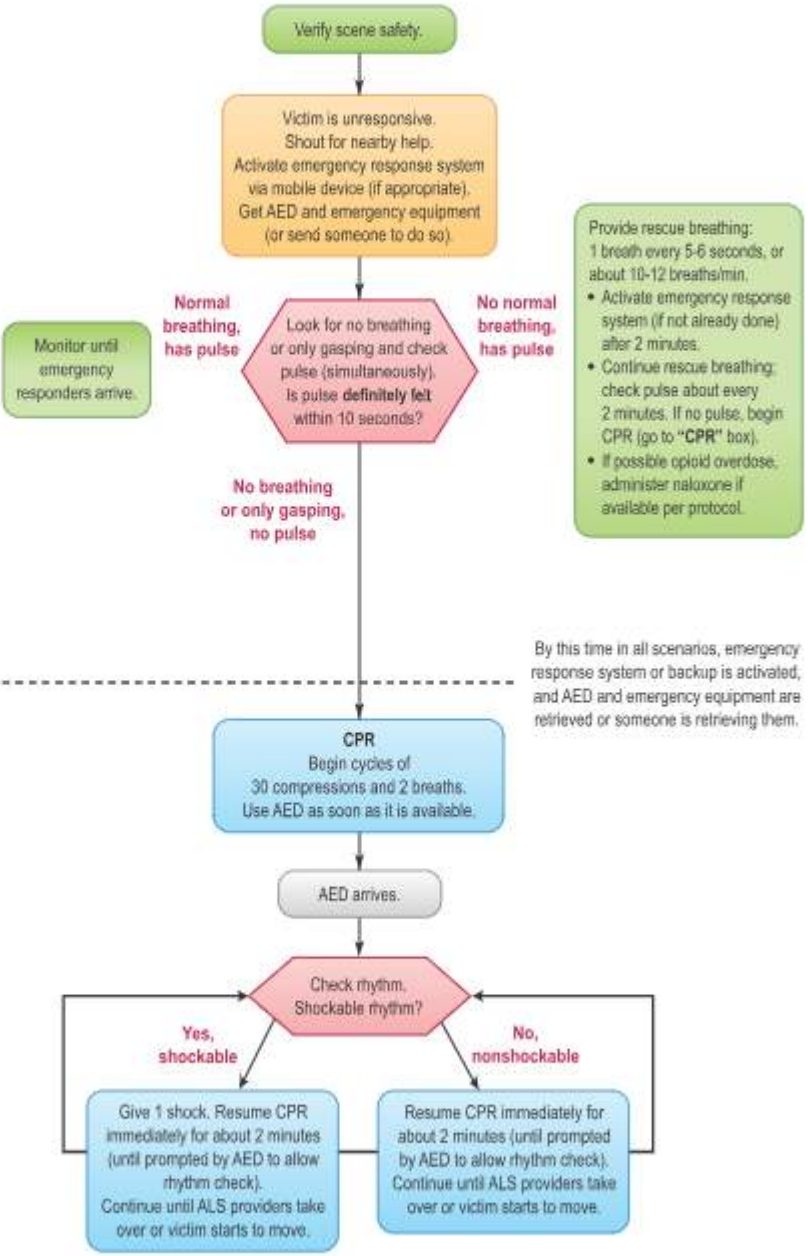
Component	Adults and Adolescents	Children (Age 1 Year to Puberty)	Infants (Age Less Than 1 Year, Excluding Newborns)
Scene safety	Make sure the environment is safe for rescuers and victim		
Recognition of cardiac arrest	Check for responsiveness No breathing or only gasping (ie, no normal breathing) No definite pulse felt within 10 seconds (Breathing and pulse check can be performed simultaneously in less than 10 seconds)		
Activation of emergency response system	If you are alone with no mobile phone, leave the victim to activate the emergency response system and get the AED before beginning CPR Otherwise, send someone and begin CPR immediately; use the AED as soon as it is available	***Witnessed collapse*** Follow steps for adults and adolescents on the left ***Unwitnessed collapse*** Give 2 minutes of CPR Leave the victim to activate the emergency response system and get the AED Return to the child or infant and resume CPR; use the AED as soon as it is available	
Compression-ventilation ratio *without advanced airway*	***1 or 2 rescuers*** 30:2	***1 rescuer*** 30:2 ***2 or more rescuers*** 15:2	
Compression-ventilation ratio *with advanced airway*	Continuous compressions at a rate of 100-120/min Give 1 breath every 6 seconds (10 breaths/min)		
Compression rate	100-120/min		
Compression depth	At least 2 inches (5 cm)*	At least one third AP diameter of chest About 2 inches (5 cm)	At least one third AP diameter of chest About 1½ inches (4 cm)
Hand placement	2 hands on the lower half of the breastbone (sternum)	2 hands or 1 hand (optional for very small child) on the lower half of the breastbone (sternum)	***1 rescuer*** 2 fingers in the center of the chest, just below the nipple line ***2 or more rescuers*** 2 thumb-encircling hands in the center of the chest, just below the nipple line
Chest recoil	Allow full recoil of chest after each compression; do not lean on the chest after each compression		
Minimizing interruptions	Limit interruptions in chest compressions to less than 10 seconds		

*Compression depth should be no more than 2.4 inches (6 cm).

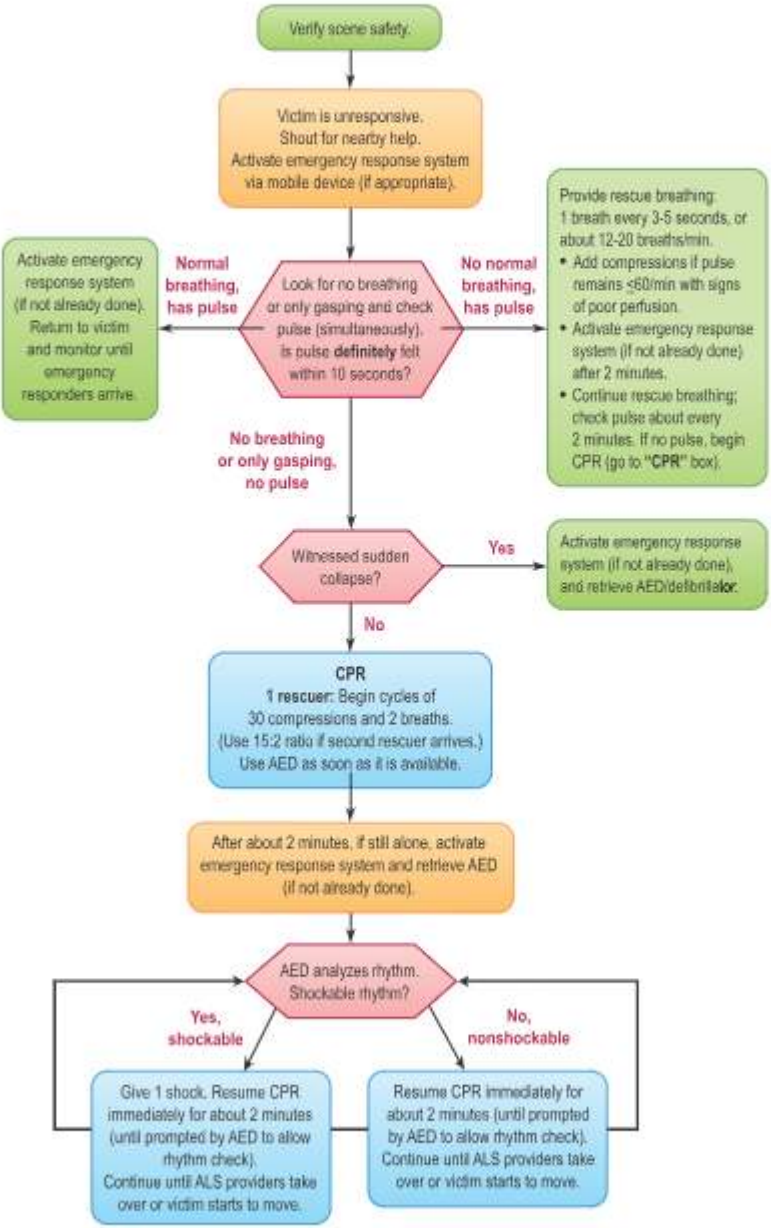
Abbreviations: AED, automated external defibrillator; AP, anteroposterior; CPR, cardiopulmonary resuscitation.

1

BLS Heathcare Provider Adult Cardiac Arrest Algorithm - 2015 Update

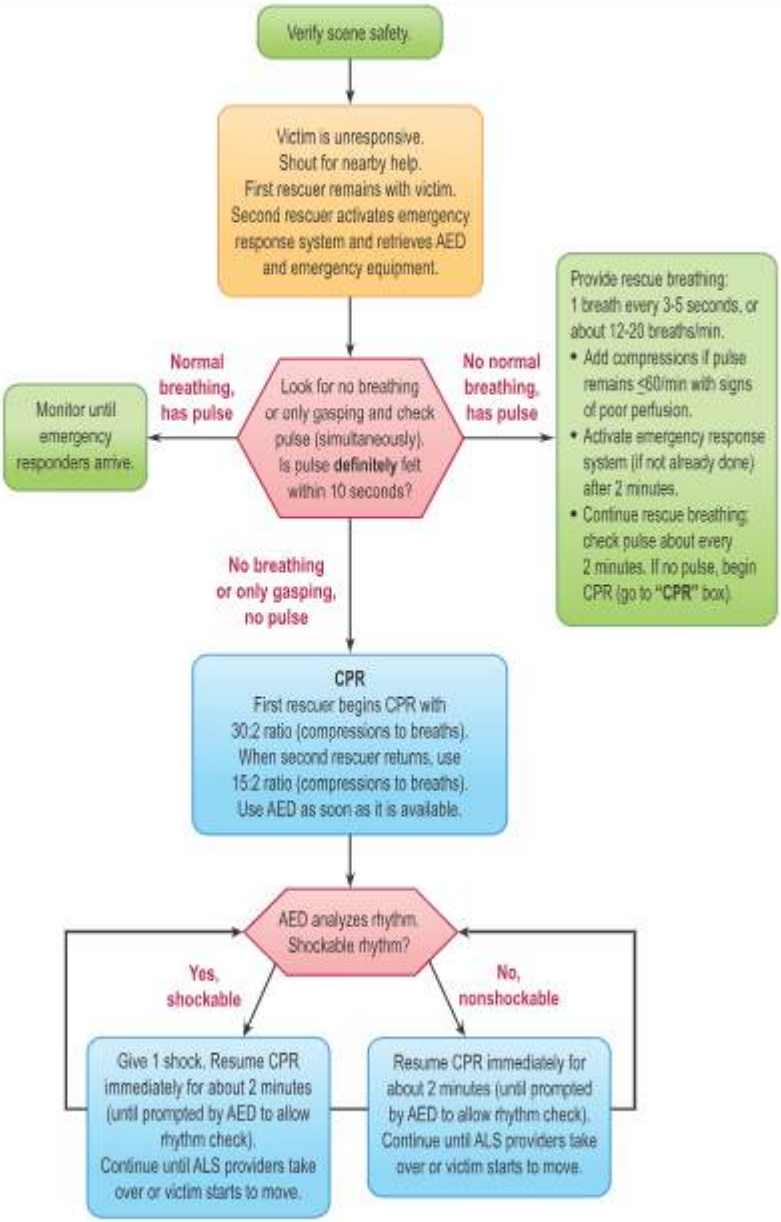


BLS Heathcare Provider Pediatric Cardiac Arrest Algorithm for the Single Rescuer-2015 Update



1

BLS Heathcare Provider Pediatric Cardiac Arrest Algorithm for 2 or More Rescuers- 2015 Update



SESSION 2

INFORMED CONSENT

Informed Consent is the process by which a fully informed patient can participate in choices about his/her health care. It originates from the legal and ethical right the patient has to direct what happens to his/her body, and also from the ethical duty of the physician to involve the patient in his/her health care.

Elements of Informed Consent

- The nature of the decision/procedure
- Reasonable alternatives to the proposed intervention
- The relevant risks, benefits, and uncertainties related to declining or receiving each alternative
- Assessment of patient understanding
- The acceptance of the intervention by the patient voluntarily, without coercion or duress.

Decision Making Capacity

Decision-making capacity, or competency, simply means that the patient can understand and explain the options, their implications, and give a rational reason why he or she would decide on a particular option instead of the others

The components of decision-making capacity are as follows:

- The ability to understand the options and their consequences
- The ability to evaluate the personal cost and benefit of each of the consequences and relate them to the patient's own set of values and priorities
- If the patient is not able to do all of the components, family members, court-appointed guardians, or others (as determined by state law) may act as "surrogate decision-makers" and make decisions for him/her.
- In the case of children, although they have decision making capacity, they usually do not have legal empowerment to give informed consent. Parents or other surrogate decision-makers may give informed permission for diagnosis and treatment of a child.

2

Steps in Obtaining Consent

· Give your own name and authority
· Check the patient's name. Explain what you are doing.
· Check what the patient already knows
· What is wrong: explain the diagnosis in simple language.
· Action: What is the proposed action?
· Outcome: Describe the likely short- and long-term outcomes.
· Choices: Describe all viable choices, including doing nothing.
· Complications:
o Explain clearly to the patient all serious complications
o Describe the actions that will be taken to prevent each
o Explain the management of complications if they occur

The Right to Refuse Treatment

- Patients who are legally competent to make medical decisions and who are judged by health care providers to have decision-making capacity have the legal and moral right to refuse any or all treatment.
- If the patient refuses treatment he/she may be asked to sign an Against Medical Advice (AMA) form to protect the health care provider from legal liability for not providing the disputed treatment.
- If, because of intoxication, injury, illness, emotional stress, or other reason, a health care provider decides that a patient does not have decision-making capacity, the patient may not be able to refuse treatment.

Closure and Documentation of Consent

- Once everything has been thoroughly discussed with the patient, use open questions such as "Is there anything else you would like to discuss?"
- For many tests and procedures, such as routine blood tests, x-rays, and splints or casts, consent is implied. No written documentation of the consent process is obtained
- For many invasive tests or for treatments with significant risk, the patient should be given a written consent form and a verbal explanation, both preferably in the patient's language
- The consent form should be signed and dated both by the doctor and by the patient. The patient may also be given a copy of the signed consent form.

DEATH RECOGNITION AND CERTIFICATION

Death should be verified by a doctor, or other suitably qualified personnel.

Examination for Declaration of Death

· A thorough physical examination should be carried out to ascertain whether or not death has taken place.

· First inspection should reveal a deathly pallor (Particularly of the face and lips) and relaxation of the facial muscles.

· Further examination should include:

o Palpation of all major pulses.

o Auscultation of the heart and lungs for at least one minute, repeated at intervals over at least five minutes. If facilities are available, record an ECG for at least 5 minutes.

o Inspection of the eyes for fixed dilated pupils, absence of corneal reflexes, and cloudiness of the cornea and loss of eye tension.

o Examination of the trunk may show evidence of hypostasis.

o Examination of muscle tone for rigor mortis.

o Decreased temperature - will depend on ambient temperature.

Certification of Death

Management of a death will depend on:

- The circumstances of the death.
- Where it has occurred.
- Whether or not it was anticipated.
- Whether or not there is any suspicion of foul play.
- Relatives and/or friends of the deceased may be very distressed and physician attending a death should offer support where appropriate.
- Bereaved families may also require guidance on the procedures following a death, particularly if the death was unexpected.
- Verification of death may be performed by any appropriately qualified person.

Death certificate

- A death certificate may be issued by a doctor who has provided care during the last illness and who has seen the deceased after death.
- They should be confident about the cause of death.

Deaths to be reported to the Municipal Corporation

- Identity of deceased and/or cause of death unknown
- Sudden, unexpected, suspicious, violent (homicide, suicide, accidental) or unnatural deaths
- Deaths due to alcohol, drugs, poisoning or suicide

- Doubtful stillbirth
- Death as a result of an illegal abortion
- Deaths related to surgery or anaesthetic
- Deaths within 24 hours of admission to hospital
- Deaths in prison.

COMMUNICATION SKILLS

Communication skills are essential to almost all aspects of health care, from history taking to providing information to the patient. Good doctors communicate effectively with the patients, and can identify patients' problems more accurately. The patients are also more satisfied with the care they receive and are more likely to adhere to treatment and to follow the advice on behavior change.

Key Tasks in Communication with Patients

Eliciting patient's problems and concerns:
- Establish eye contact and maintain it at reasonable intervals to show interest.
- Use active listening to clarify patients' concerns.
- Encourage patients to be exact about the sequence in which their problems occurred.
- Summarize information to show patients they have been heard.

Giving information

- Ask the patients what information they would like and prioritize their information needs.

Discussing treatment options

- Properly inform the patients of treatment options.
- Patients who take part in the decision making are more likely to adhere to treatment plans.

Being supportive

- Use empathy to show that you have some sense of how the patient is feeling.

Steps for effective communication

- Ensure privacy and respect confidentiality.
- Allow enough uninterrupted time.
- Use words the patient will understand.

- Be adequately prepared regarding the clinical situation, records and patient's background.
- Introduce yourself to the patient and strive to remember the patient's name.
- Help the patient focus on their problems.
- Learn to say "Yes" or "No" tactfully.
- Try to exhibit a neutral approach.
- Assess how problems are affecting the patient and try to see problems from patient's point of view.
- Do not dominate.
- Admit areas of ignorance.
- Communicate slowly and interrupt with care.
- Encourage the patient from time to time.
- Try to avoid too many leading questions.
- Pick up verbal and non-verbal clues.
- Be realistic about what you and the medical services can provide.

Non-verbal Communication

- Eye contact, gestures and posture are all important.
- Use hand movements to emphasize points.
- Appropriate touching of the patient and the doctor's facial expressions can convey their attitudes.
- Read the patient's non-verbal clues: face/body language, silences, and tears.

Imparting information

- Assess the patient's understanding first: what the patient already knows, is thinking or has been told.
- Give information simply and honestly: repeat important points.
- Do not give too much information too early.
- Give information in small "chunks"; categorize information giving.
- Use language carefully with regard given to patient's intelligence, reactions, and emotions.
- Check that the patient has understood and remembered your advice.
- Encourage patient involvement and invite feedback.

Planning and support

- Identify a plan for what is to happen next.
- Give a broad time frame for what may lie ahead.
- Give hope tempered with realism.

Follow up and closing

- Summarize and check with patient.
- Identify support systems; involve relatives and friends
- Make written materials available.

2

Special Communication Situations

I. Conveying the diagnosis of major/ serious illness that might lead to death or permanent disability:

- Discussion should always be face-to-face and never over the phone.
- Allow enough time for all the patient's questions to be answered.
- Present the whole truth but be optimistic, don't take away the patient's hope.
- Allow for "shut down" (when patient turns off and stops listening) and then give time and space: allow possible denial.
- Respond to patient's feelings and predicaments with acceptance, empathy and concern.

II. End-of-life communication:

- There should be a sincere and heartfelt expression of sympathy.
- Patient and family sometimes need to be reminded that the patient has had a good life.
- Emphasize that everyone involved did everything possible to keep the patient comfortable till the end.

SESSION 3

MEASUREMENT OF BLOOD PRESSURE AND SAMPLING TECHNIQUES

Equipment

- Blood pressure measuring apparatus (mercury, aneroid)
- Stethoscope
- Comfortable couch

Objectives

- To measure systolic and diastolic blood pressure in sitting as well as standing position.

Steps

- Explain the procedure to the patient and take consent.
- Check that apparatus is working and is set at zero.
- Ideally, the upper arm should be bare.
- Check the radial and brachial pulses.
- Take the correct cuff size.
- Wrap the cuff neatly around the arm making sure that the area around the brachial artery is clear. The mark on the cuff should be pointing the brachial artery pulse.
- Support the arm at heart level.
- Inflate the cuff while palpating the radial artery and determine the systolic blood pressure by palpation.
- Close the valve on the rubber inflating bulb and inflate the cuff to about 20-30 mmHg over the systolic pressure.
- If the usual systolic pressure is unknown then inflate up to 210 mmHg.
- Let the cuff deflate slowly (2mm/sec) by opening the valve.
- The point is noted where the first Korotkoff sound is heard and this systolic pressure is noted to the nearest 2mm. Continue to deflate and note the point at which the sound disappears (Korotkoff Vth sound). This marks the diastolic blood pressure.
- Recheck the blood pressure in standing position.
- Remove the cuff from around the arm.
- Record blood pressure measurements on a paper.

Risks

- No significant risk is associated with checking blood pressure.
- If test is repeated a few times, the patient may feel tingling or numbness in that arm.

3

Points to note

- Enquire about any blood pressure medication before starting.
- Make sure the patient is relaxed.
- Postural hypotension is present when the systolic blood pressure falls by 20 mmHg or more.
- Obese patients need large cuffs and if you use a standard cuff, you will get a false high reading as the cuff has to exert a greater pressure to compress the artery.

BLOOD SAMPLING

Equipment

- Vacutainer
- Disposable syringes
- Alcohol swabs
- Sterile gloves
- Tourniquet
- Cotton swabs
- Sharps' bin

Steps of procedure

- Introduce yourself to the patient and take consent.
- Select equipment from the tray.
- Position the arm keeping it comfortable and identify the vein.
- Apply tourniquet proximal to the vein and recheck the vein.
- Wear sterile gloves.
- Swipe alcohol swab over the vein only once.
- Explain the patient that he will feel a sharp prick.
- Insert the needle steadily with the bevel upwards.
- Draw blood into the syringe.
- Loosen the tourniquet once blood appears in the syringe.
- Place a ball of cotton wool at the injection site and withdraw the needle.
- Ask the patient to press over the cotton wool without bending the arm.
- Transfer the blood into the vacutainer.
- Discard the needle and remove the gloves.
- Thank the patient
- Label the vacutainer carefully.

Cap color	Activator	Draw Vol.	Applicable Test Items	Recommended Blood Collection Order
Red	None	3, 4, 5, 6, 7	Biochemistry, Immunology	
Yellow	Clot Activator with Gel	3, 4, 5, 6, 7	Biochemistry, Immunology	Serum Tube (Plain Tube)
Orange	Coagulant	3, 4, 5, 6, 7	Biochemistry, Immunology	↓
Blue	Sodium Citrate 1:9	2, 3, 4, 5	Clotting Mechanism	Clot Tube ↓
Grey	Sodium Fluoride & Potassium Oxalate Sodium Fluoride & Sodium Heparin	2, 3, 4, 5	Blood Sugar, Tolerance	Plasma Tube ↓
Green	Lithium Heparin/ Sodium Heparin	3, 4, 5, 6, 7	Plasma Biochemical Test Rheology Measurement	EDTA Tube ↓
Lavender	EDTA K2	2, 3, 4, 5, 6	Clinical Hematology	Glucose Tube ↓
Black	Sodium Citrate 1:4	2, 3, 5	Blood Sedimentation Rate Testing	Other Collection Tube
White	EDTA K2 / Clot Activator with Gel	5, 6, 7, 8	Quantitative Monitoring of HIV Screening and Clinical Screening of Blood	

Fig 3.1 Summary of types of Vacutainers

INJECTIONS

Equipment and resources

- Medications
- Disposable syringes 0.5cc, 1cc or 2cc
- Vials
- Tuberculin syringe(s)
- Gloves
- Cotton balls
- Alcohol swabs
- Sharps' bin

Intra Dermal Injection

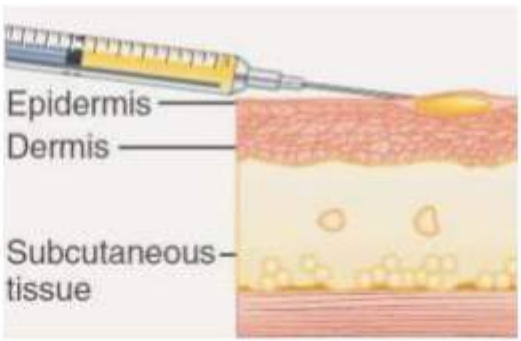


Fig 3.2 Administration of Intra Dermal Injection

3

Objectives

- Conducting skin allergy tests
- Testing for antibody formation
- Drug administration

Precautions

- This is a painful procedure and is used only with small amounts of solution.

Fig 3.3 Administration of Subcutaneous Injection

Complications

- Irritation, itching, swelling.

Subcutaneous Injection

Objectives

- To administer drugs when a small amount of fluid is to be injected or a slow release of the drug is required (growth hormone, insulin, epinephrine, etc.).
- The patient is unable to take the drug orally, or the drug is destroyed by intestinal secretions.

Precautions:

- Subcutaneous injections are not given if the skin is burnt, hardened, inflamed, swollen or damaged by a previous injection.

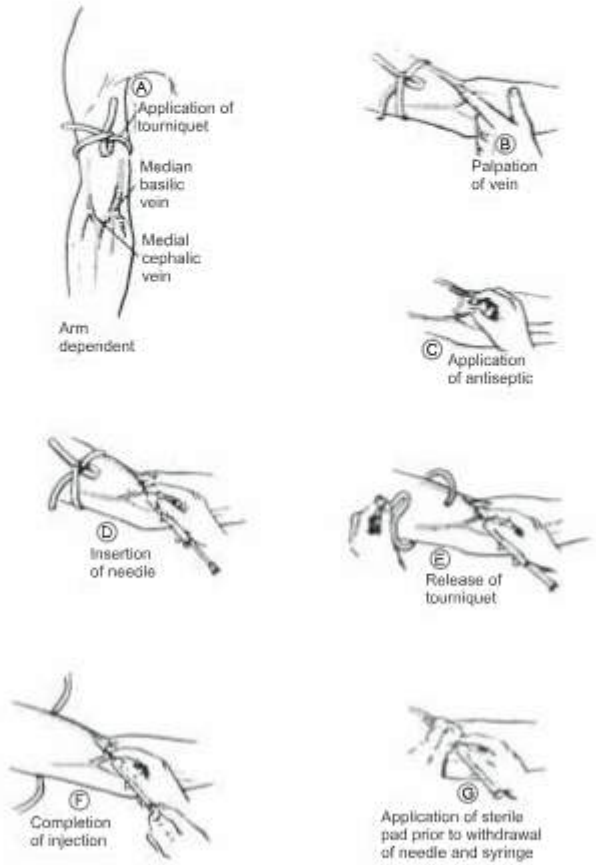


Fig 3.4 Administration of Intravenous Injection

3

Intravenous Injections

Objectives

- Rapid systemic action of the drug is required
- Patient unable to take drug through oral route
- Drug destroyed by the intestinal tract
- Relatively larger dose of drug to be administered.

Points to note

- Always insert the needle so that it points in the direction of the blood flow. In this way the solution and the blood travel in the same direction and the medication does not impede or go against the direction of the flow.

Complications

- Arterial and neurological injury.
- Infection
- Arterio-venous fistula
- Thrombophlebitis

Intramuscular Injections

Objectives

- Rapid systemic action required
- Relatively larger dose of drug to be administered
- Lack of expertise to give intravenous injection (at home)

Fig 3.5 Administration of Intramuscular Injection

Complications

- Abscess or hematoma formation.
- Nerve damage.

Points to note

- Make sure that you use the needle which has a sharp point and no hooks on the end to minimize pain and tissue injury.
- Select the proper site taking into consideration the age and built of the patient, otherwise you may hit a bone, blood vessel or nerve.
- Be careful with diabetic patients, they are more likely to get injection abscesses.
- Always enquire about any bleeding / coagulation disorders, to avoid risk of hematoma formation.
- Two to four hours after injection, the site should be checked to ensure there has been no adverse reaction.
- If injections are repeated frequently, the sites should be documented to ensure an even rotation.

Summary of Intradermal, Subcutaneous, and Intramuscular Injections

Type of Injection	Purpose	Site	Needle Size	Maximum Dose	Angle of Insertion
Intradermal	Injects medication below the epidermis; drugs are absorbed slowly; typically used for diagnosis of tuberculosis and allergens	Inner aspect of forearm; upper chest; upperback	Syringe with short bevel; 25- to 27 gauge; 3/8 to 1/2 inch	0.01 to 0.1 ml	10°-15° 
Subcutaneous	Injects medication between dennis and muscle; absorbed slowly; typically used for insulin and anticoagulants	Abdomen; lateral and anterior aspects of upper arm and thigh; scapular area on back; ventrogluteal area	25-gauge, 5/8-inch needle (varies by size of person)	0.5 - 1.0 ml	45° or 90° 
Intramuscular	Used to promote rapid drug absorption and to provide an alternate route when drug is irritating to SC tissue	Ventrogluteal; dorsogluteal; anterolateral aspect of thigh (vastus lateralis); upper arm (deltoid)	The gauge and length of needle are selected on the basis of medication volume and viscosity and client's body size	Well-developed adult: 4 ml in a large muscle; infant and small child: 0.5-1.0ml; children and elderly: 1-2 ml; deltoid muscle: 0.5-1 ml	90° 

Fig 3.6 Summary of Injection Types

VENOUS CANNULATION

Essential resources and equipment:

- Needles (branulas) and intravenous catheters
- Pyodine scrub
- Alcohol swabs / antiseptic solution
- Disposable syringes – 5cc,10cc
- Portable I/V stand
- 3*3 cm sterile gauze pieces
- Disposable gloves of various sizes

3

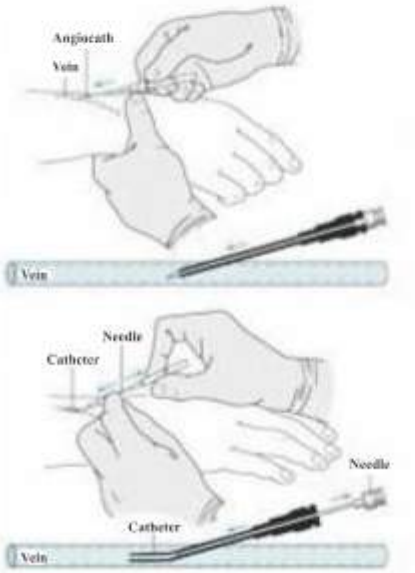
- Tourniquet
- Lignocaine gel

Fig 3.7 Types of Venous Cannulas

Objectives

- Administration of:
- short term, low risk I/V therapy
- Isotonic fluids and drugs
- Blood and blood products
- Blood samples may be obtained

Ideal IV insertion



Place Tourniquet 2-3 inches above site.

Place traction on vein and skin using non dominant hand

Pierce skin then advance to vein

When flashback appears advance entire catheter/needle unit 1/16 in to 1/8 in to ensure catheter is in vein

Thread catheter off of needle and into vein, withdraw needle and activate safety mechanism

Fig 3.8: Venous Cannulation

Major complications

- Arterial and neurological injury.
- Infection
- Arterio-venous fistula
- Thrombophlebitis
- Deep vein thrombosis (in case of a lower limb vein).

VENOUS CUTDOWN

Objective

- Venous cut down is indicated when peripheral veins in the extremities are difficult to access because of obesity, vascular collapse, or frequent vein puncture

Usual sites

- Saphenous vein (near medial malleolus of ankle)
- Anti cubical vein at the elbow (Basalic vein)

Requirements

- Observe universal precautions.
- Preliminary hand wash and sterile gloves.
- Pyodine scrub
- Sterile drape
- No.11 blade knife
- 2 small artery forceps
- 4.0 Silk ties
- 4 .0 Silk or Nylon suture on a cutting needle for skin closure
- 0.5 or 1 % xylocaine
- 5cc Syringe
- Tourniquet
- 23 gauge needle
- Appropriate size placement venous catheters depending on patient
- IV fluid Dextrose or Ringers Lactate, connected to IV tubing and ready for infusion

3

Saphenous vein cut down procedure

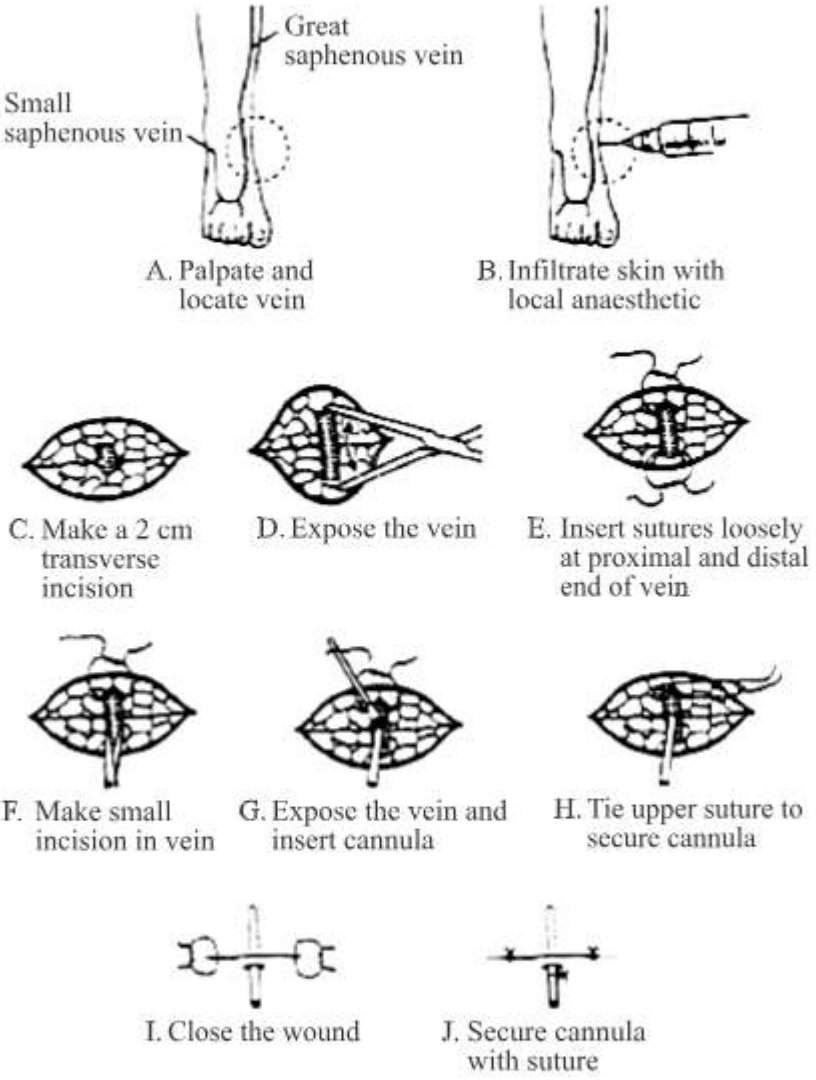


Fig 3.9 Saphenous Vein Cut Down Procedure

Complications

- Local bleeding
- Infection, phlebitis
- Thrombosis
- Catheter occlusion or dislodgment

SESSION 4

CENTRAL VENOUS CANNULATION

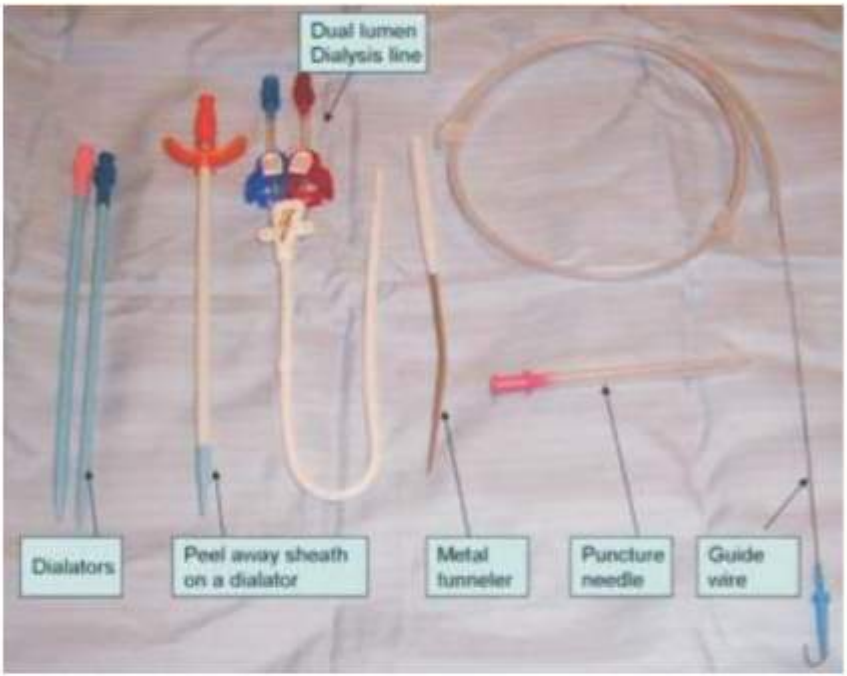


Fig 4.1 CVP Line Insertion Kit

Equipment:

- Triple lumen catheter
- Local anaesthetic drugs i.e. Xylocaine 2%.
- Disposable syringes 5cc and 10cc.
- Disposable gloves.
- Pyodine solution as antiseptic.
- Silk for fixation
- Masks, caps and gowns.
- Heparin mixed normal saline.
- Three way stop cock.

Fig 4.2 Triple Lumen Catheter

Indications:

- Patients with inaccessible peripheral vein due to shock, hypovolemia, haemorrhage etc.
- Major surgeries e.g. CABG, renal transplant.
- Prolonged surgeries e.g. Whipple's procedure.
- For TPN and prolonged NPO.
- Critically ill patients in ICU.
- Procedures where massive blood loss is anticipated.

Contraindications:

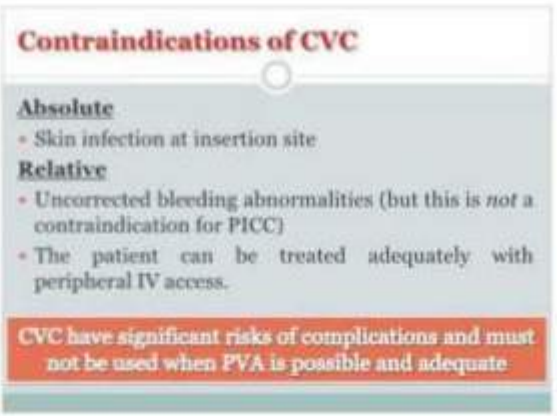


Fig 4.3 Contraindications to CVC

Sites for CVP Insertion:

1. Internal jugular vein
2. External jugular vein
3. Subclavian vein.
4. Femoral vein.
5. Peripherally inserted catheter line e.g. through basilic and cephalic vein.

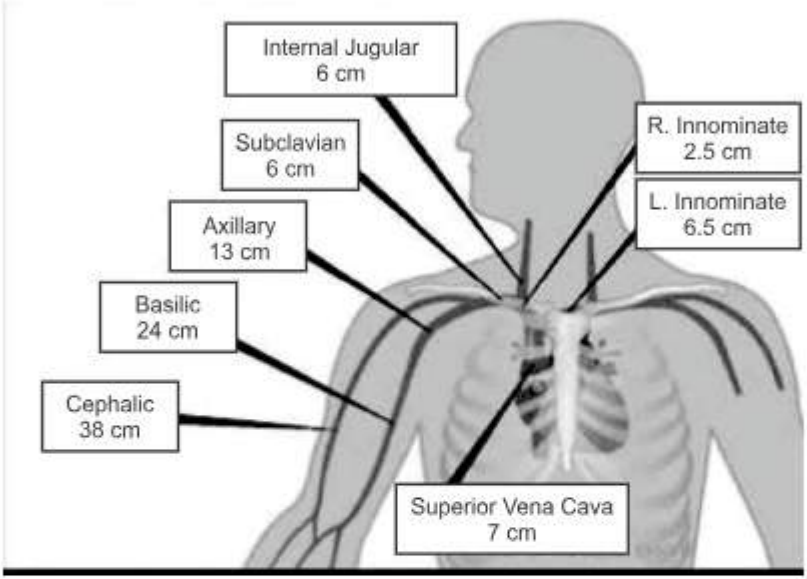


Fig 4.4 Common sites for Central Venous Catheterisation

Methods/steps:

Internal jugular vein:

1. Explanation of procedure to the patient.
2. Position of patient i.e. supine, 15 degree head down and face turned to opposite side.
3. Marking and identification of carotid artery and internal jugular vein.
4. Wearing mask, cap, washing hands, wearing sterile gown and gown.
5. Application of antiseptic solution to the neck and upper chest and draping.
6. Infiltration of 2% xylocaine, 3cc at the point of insertion of needle.
7. Once internal jugular vein is located the Seldinger wire passed.
8. Then dilator is threaded over the wire to make tunnel subcutaneously.
9. Triple lumen is passed over wire.
10. All the three lumen are irrigated with heparinised solution one by one and any air bubble is removed.
11. Seldinger wire is removed at the last.

12. Triple lumen is fixed at ends and antiseptic dressing is applied.
13. X-ray chest is advised to confirm the position of CVP and to detect pneumothorax.

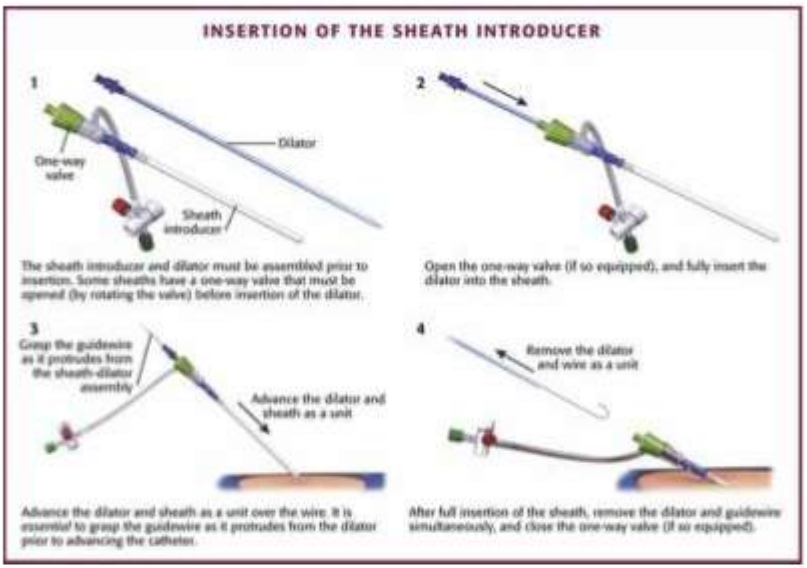


Fig 4.5 Steps of Insertion of CVP Line

SESSION 5

NASOGASTRIC AND ENDOTRACHEAL INTUBATION

Objectives

- Used for enteral feeding initially
- Decompress the stomach by aspiration of gastric contents (fluid, air, blood)
- To remove poisonous and obnoxious ingested material
- Assist in clinical diagnosis through analysis of substances found in gastric contents
- For the induction of emergency anesthesia.

Requirements

- Disposable gloves
- Lignocaine gel
- Nasogastric tube of appropriate size
- 60 cc irrigating syringe (bladder wash)
- Stethoscope
- Non allergenic tape
- A glass of water

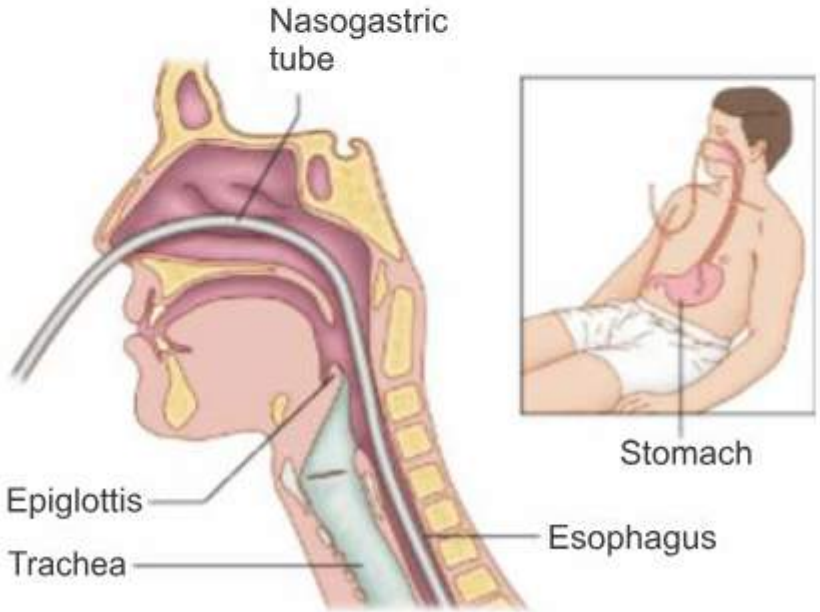


Fig 5.1: Placement of tube in Nasogastric Intubation

5

Mechanics of the Procedure

- Explain the procedure to the patient and show the equipment
- Take consent from the patient
- Wash hands and wear properly sterilized gloves.
- If possible, sit patient upright for optimal neck/stomach alignment
- Examine nostrils for deformity/obstructions to determine best side for insertion
- Using the NG tube as a measuring device determine the length of the NG tube to be passed by measuring the length from

o nose to earlobe
o earlobe to xiphoid processs

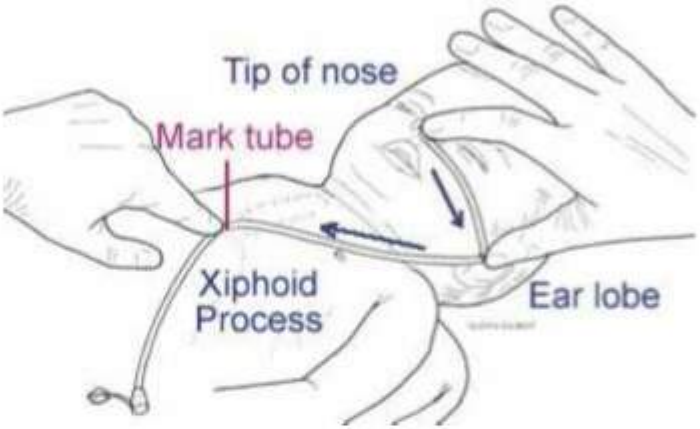


Fig 5.2: Determining the length of NG tube to be passed in a child

- Mark measured length with a marker or note the distance
- Lubricate 2-4 inches of tube with lubricant (preferably 2% Xylocaine).
- Pass tube via either nare posteriorly, past the pharynx into the esophagus and then the stomach. Instruct the patient to swallow (you may offer ice chips/water) and advance the tube as the patient swallows. Swallowing of small sips of water may enhance passage of tube into esophagus.
- Withdraw tube immediately if changes occur in patient's respiratory status, if tube coils in mouth, if the patient begins to cough or turns colors.
- Advance tube until mark is reached
- Verify NG tube placement in the stomach by two of the following:

o Chest X-ray
o Aspirating gastric contents with the irrigation syringe
o While listening over the epigastrium with a stethoscope quickly instill a 30cc air bolus with the irrigation syringe. Air entering the

stomach will produce a "whooshing" sound.
- o Ask the patient to hum or talk. Coughing, cyanosis or choking may indicate that the NG tube has passed through the larynx.
- o Place the open end of the NG tube in a cup of water. Persistent bubbling may indicate that the NG tube has passed through the larynx.
- · If unable to positively confirm that the NG tube has been placed is in the stomach the tube must be removed immediately and re-attempted.
- · Once confirmed for placement, secure the NG tube by placing one end of tape on from the bridge to the tip of the nose and the other end wrapped around the tube itself.
- · If for suction, remove syringe from free end of tube; connect to suction; set machine on type of suction and pressure as prescribed.
- · Document the reason for the tube insertion, type & size of tube, the nature and amount of aspirate, the type of suction and pressure setting if for suction, the nature and amount of drainage, and the effectiveness of the intervention.

Complications
- · Nasal irritation, sinusitis, epistaxis, rhinorrhea, skin erosion or esophagotracheal fistula secondary to NG placement.
- · Aspiration pneumonia secondary to vomiting and aspiration.
- · Hypoxia, cyanosis, or respiratory arrest due to accidental tracheal intubation.
- · Nostril skin damage with prolonged use, and even espophageal stricture in a few days.
- · Injury to the esophagus if not properly lubricated.

ENDOTRACHEAL INTUBATION

Objectives
- · Airway Patency
- o Protects the airway, for example in comatose and intoxicated patients
- o Maintains patency during positioning
- · Control of Ventilation
- o Ventilation over a long period of time without intubation can lead to gastric distention and regurgitation
- · Route of Inhalational Anesthesia and Emergency medications
- o Atropine
- o Lidocaine
- o Epinephrine
- · Diagnostic manipulations of the airway such as bronchoscopy
- · In intensive care medicine for patients who require respiratory support

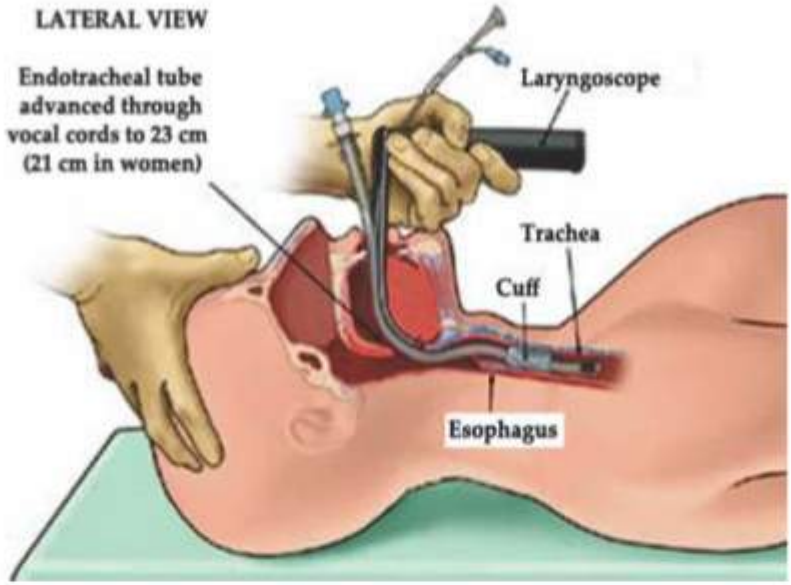


Fig 5.3: Endotracheal intubation using a Laryngoscope

Resources and requirements

- Self-refilling bag-valve combination (eg, Ambu bag) or bag-valve unit (Ayres bag), connector, tubing, and oxygen source. Assemble all items before attempting intubation.
- Laryngoscope with curved (Macintosh type) and straight (Miller type) blades of a size appropriate for the patient.
- Endotracheal tubes of several different sizes. Low-pressure, high-volume cuffed balloons are preferred.

o size: adult male 8 to 9 mm tube

o Adult female 7 to 8 mm tube

o Tube length: extend from lower incisor to a point midway between the cricoid cartilage and Louis's angle

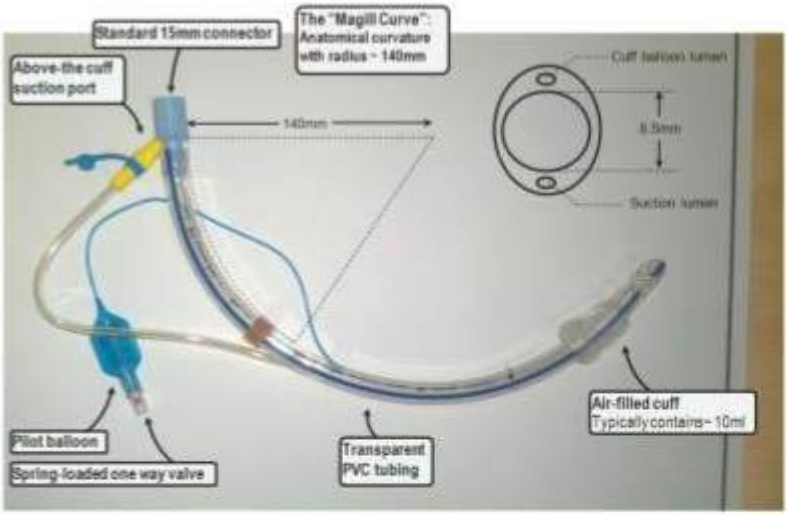


Fig 5.4: Anatomy of the endotracheal tube

- Oral airway
- Tincture of benzoin and precut tape.
- Introducer (stylets or Magill forceps).
- Suction apparatus (tonsil tip and catheter suction).
- Syringe, 10-mL, to inflate the cuff.
- Mucosal anesthetics (e.g., 2% lidocaine)
- Water-soluble sterile lubricant.
- Gloves.

Procedure:

- Inform the patient about the procedure and take consent
- Wash hands and wear sterilized gloves.
- Ventilate with 100% oxygen for approximately one minute

o Select the proper-sized mask; it should cover the mouth and nose and fit snugly against the cheeks.

o Place the mask over the patient's mouth and nose with the right hand.

o With the left hand, place the small and ring fingers under the patient's mandible, and lift up to open the airway. Grasp the mask with the thumb and index finger, and press it to the patient's face while lifting the mandible with the ring and small fingers.

o Compress the bag with the right hand.

- The chest should rise with each breath, and airflow should be unimpeded. If not, reposition the mask , and try again. Occasionally, insertion of an oral or nasal airway facilitates ventilation by mask. Because of the lack of support for the lips
- Topical Anesthesia: Anesthetize the mucosa of the oropharynx, and upper airway with lidocaine 2%
- Direct Laryngoscopy
- Positioning of the patient: Position bed height to bring the patient's head to mid-abdominal length
- Flex the cervical spine and extend the head at the atlanto-occipital joint
- Long axis of the oral cavity, pharynx, and trachea lie almost in a straight line
- Check the laryngoscope and blade for proper fit, and make sure that the light works
- Open the patient's mouth with the right hand, and remove any dentures
- Grasp the laryngoscope in the left hand
- Spread the patient's lips, and insert the blade between the teeth, being careful not to break a tooth.
- Pass the blade to the right of the tongue, and advance the blade into the hypopharynx, pushing the tongue to the left
- Lift the laryngoscope upward and perpendicular, without changing the angle of the blade, to expose the vocal cords

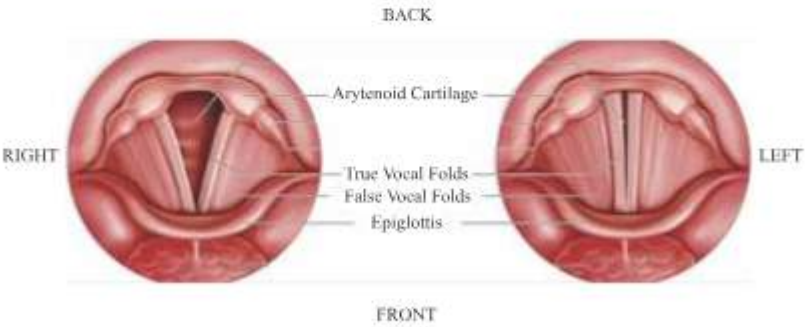


Fig 5.5: Vocal cords as seen on laryngoscopy

- Orotracheal Intubation:
  - Select the proper-sized tube
  - With the 10-mL syringe, inflate the balloon with 5-8 mL of air. Make sure that the balloon is functional and intact
  - Lubricate the end of the tube
  - Insert the stylet, and bend the tube and stylet gently into a crescent shape so that the tip of the stylet is at least 1 cm proximal to the end of the tube.
  - Ventilate the patient with the bag-valve combination for 1-2 minutes with 100% oxygen
  - Proceed the direct laryngoscopy (as explained above), and when visualizing the glottis and vocal cords ,gently pass the tube next the laryngoscope blade through the vocal cords into trachea, far enough so that the balloon is just beyond the cords. Occasionally, gently pressing posteriorly on the anterior neck at the level of the larynx will help to bring an anteriorly placed larynx into view and facilitate intubation.
  - Withdraw the stylet.
  - Connect the bag-valve combination, and begin ventilation with 100% oxygen
  - Confirm that the tube is properly positioned. First, listen over the stomach with a stethoscope while ventilating the patient. If sounds of airflow are heard or if distension of the stomach occurs, the tube is in the esophagus. If the esophagus has been intubated instead of the trachea, remove the tube and try again.
  - Listen to each side of the chest; be sure that breath sounds are equal in both sides of the thorax. If not, reposition the tube. When breath sounds are equal on both sides and the thorax rises equally on both sides with each inspiration, note the position of the tube (mark the tube at patient's mouth), and inflate the cuff with the 10-mL syringe until there is no air leak around the tube when positive pressure is applied.
  - Wrap adhesive tape around the tube where it comes out of the mouth. Then carry the tape over the cheek and around the back of the head onto the other cheek. Fasten the end of the tape around the tube.
- Obtain a chest x-ray film immediately to check tube placement, and also obtain arterial blood gas measurements to assess the adequacy of ventilation.
- Re-confirm position of tube by listening to the lungs every time the patient is moved.

Extubation

- Ensure that the patient is recovering, is breathing spontaneously with adequate volumes

- Oxygenate the patient with 100% high flow oxygen for 2 to 3 minutes
- If secretions are suspected in the tracheobroncial tree, remove them with a suction catheter through the lumen of the endotracheal tube
- Ensure that the patient is not in a semiconscious state
- Turn the patient onto his side if he is still unconscious
- Unsecure the ETT from the patient's face
- Deflate the cuff and remove the endotracheal tube quickly and smoothly during inspiration
- Continue to give the patient oxygen as required

Immediate Problems

- Aspiration
- Dental trauma
- Epistaxis
- Trismus
- Emesis
- Laryngospasm
- Esophageal intubation
- Vocal cord avuision

Technical Problems

- Cuff leaks
- Medication dosage errors
- Equipment failure
- Mainstem intubation

Other

- Dysrhythmias
- Hypotension
- Pneumothorax
- Bleeding
- Cardiac arrest

Fig 5.6: Complications of Endotracheal Intubation

SESSION 6

TRACHEOSTOMY AND FOLEY CATHETERIZATION

Indications

- Severe neck or mouth injuries
- A large object blocking the airway (foreign body)
- Breathing harmful material such as smoke or steam
- Paralysis of the muscles that affect swallowing
- An inherited abnormality of the larynx or trachea
- Pharyngolaryngeal inflammation or tumor, which can affect breathing
- After major surgery involving the oral cavity, pharynx, larynx or neck
- Long-term unconsciousness or coma.

Fig 6.1: Tracheostomy tube being inserted into the trachea

Required resources and equipment:

- Tracheostomy tube (33—35F for females, 36—39F for males)
- Sterile gloves
- Scalpel
- Lignocaine, epinephrine
- Syringes
- Hooks, retractors, sutures
- Sterile swabs / sponges

Procedure:

Position:

- Patient lies supine with a pillow under the shoulders so that the neck is extended.

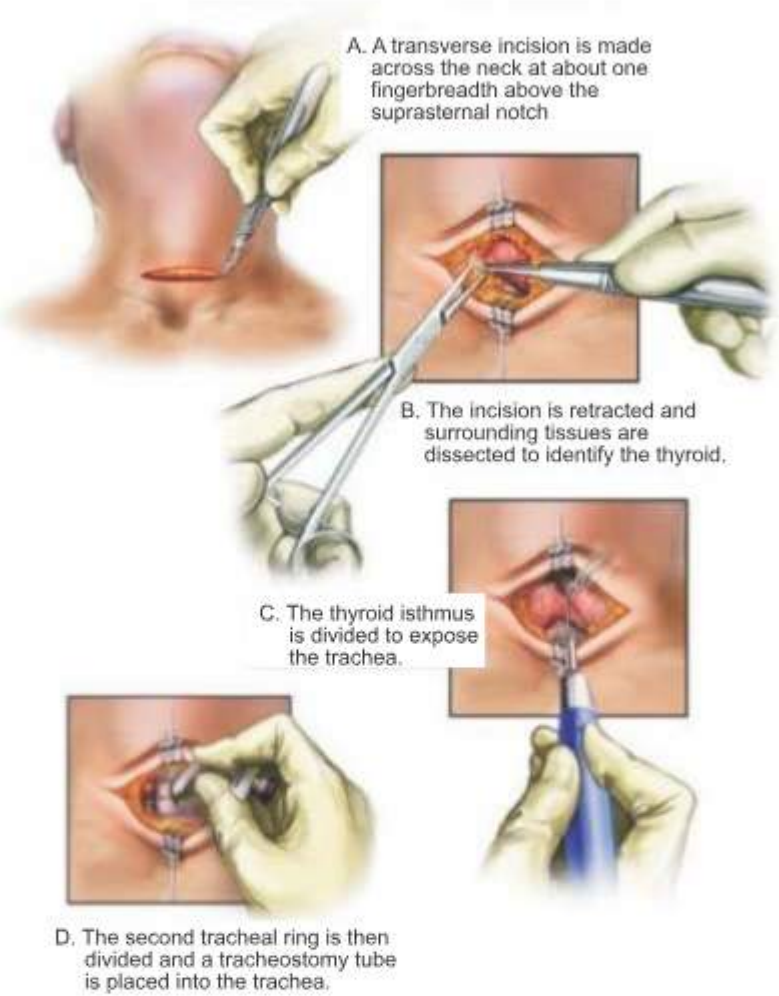


Fig. 6.2: Tracheostomy procedure

Anaesthesia:

- No anaesthesia is required in an unconscious patient.
- In conscious patient, 1-2% lignocaine with epinephrine is infiltrated in the line of incision and the area of dissection.
- Sometimes general anaesthesia with intubation may be used (elective tracheostomy).

Steps:

- Wash hands and wear sterile gloves.
- Incision:

o Vertical incision: It is made in the midline of the neck, extending

from cricoid cartilage to just above the sternal notch. This can be used for emergency and elective procedures. Rapid access, minimum bleeding and tissue dissecting.

o Transverse incision: 2 fingers' breadth above the sternal notch, 5 cm long incision. Used for elective procedures. Cosmetically better scar.

Elective tracheostomy:

- After incision, tissues are dissected in the midline. Dilated veins are either displaced or ligated.
- Strap muscles are separated in the midline and retracted laterally.
- Thyroid isthmus is displaced upwards or divided between the clamps.
- A few drops of 4% lignocaine are injected into the trachea to suppress cough when trachea is incised.
- Trachea is fixed with a hook and opened with a vertical incision in the region of 3rd and 4th or 3rd and 2nd rings. This is then converted into a circular opening by rotating the knife blade through 90' degrees.
- Tracheostomy tube of appropriate size should be inserted.
- Hemostasis is secured.
- Skin incision should not be sutured or packed tightly so as to avoid surgical emphysema.
- Return the neck to a neutral position and tie the attached tapes around the patient's neck to secure the tube.

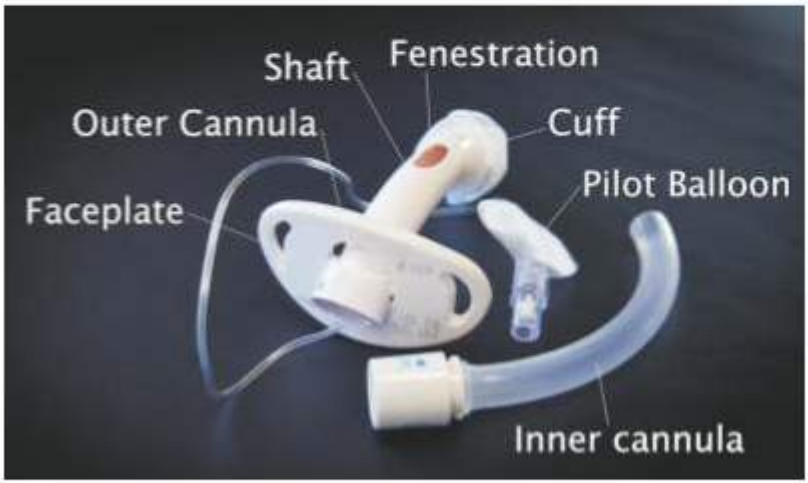


Fig. 6.3: Parts of the Tracheostomy Tube

Emergency tracheostomy:

- Patient's neck is extended.
- Trachea is identified and fixed between left thumb and index finger,

- A vertical incision is made from lower border of the thyroid to suprasternal notch cutting though skin and subcutaneous tissues.
- Lower border of cricoid cartilage is identified and a transverse incision is made in pretracheal fascia.
- The thyroid cartilage is dissected to expose the upper three tracheal rings.
- Vertical incision is made in the 2nd and 3rd rings, opened with a hemostat and converted into a circular opening.
- If an appropriate tracheostomy tube not available, any form of available tube should be inserted in the trachea as soon as possible, and blood and secretions sucked out. (Later, when the respiratory efforts become less violent a tracheostomy tube can be inserted.)
- Once the airway has been established, hemostasis is then secured by packing with sterile gauze.
- Skin incision should not be sutured or packed tightly so as to avoid surgical emphysema.

Complications:

1. **IMMEDIATE –**
   - pneumothorax or pneumomediastinum,
   - tracheoesophageal fistula,
   - injury to great vessels or recurrent laryngeal nerves,
   - bleeding
   - cardiac arrest

2. **EARLY –**
   - secretions and mucus plugging,
   - dislodged tube, respiratory arrest and post obstructive pulmonary edema

3. **LATE –**
   - bleeding from tracheoinnominate fistula,
   - tracheal stenosis
   - tracheoesophageal fistula, tracheocutaneous fistula
   - cosmetic deformity
   - decannulation problems

Problems:

1. Immune problems- air inhaled through a stoma is not filtered or moistened like it is when inhaled through the nose, or even the mouth.
2. Drowning- as little as two teaspoons of water in the stoma can the person, therefore, they cannot take shower, bathe, or swim.
3. Suffocation- if the stoma is covered, the person will suffocate, as in some cases they cannot breathe through their nose or their mouth.

FOLEY CATHETERIZATION

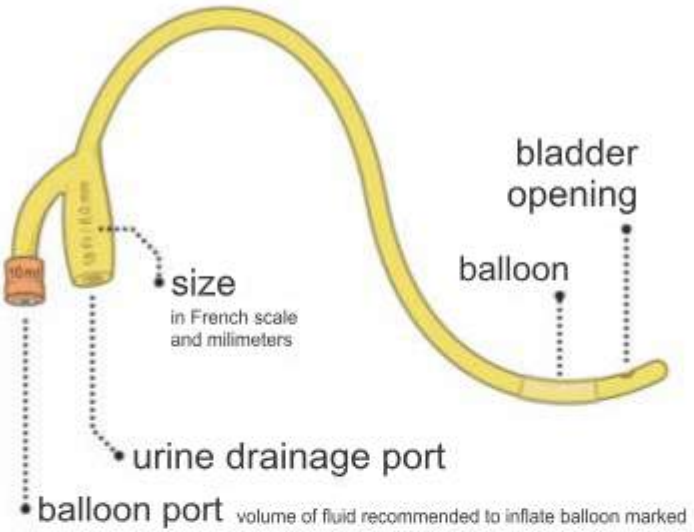


Fig. 6.4: Parts of the Foley Catheter

Objectives of the procedure:

- To relieve acute urinary retention
- Stricture of urethra
- When patient is in shock or coma
- To provide ancillary treatment to patient who has lost sphincter control
- In emergency – diagnosis of genitourinary bleeding

The resources and requirements

- Two way Foley catheter and urinary bag
- Lignocaine gel
- Sterile gloves
- Two sterile sheets
- Pyodine solution 50ml
- Bladder wash syringe
- Sponge holding forceps
- 10cc syringes
- 0.9% NaCl solution

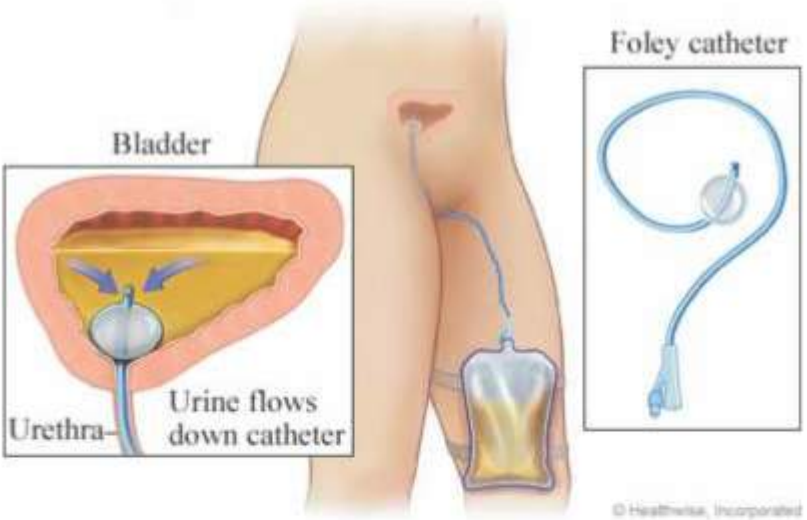


Fig. 6.5: Placement of the inflated balloon in the bladder

Procedure of catheterization

- Inform the patient about the procedure.
- Provide privacy to the patient.
- Help the patient to supine position.
- Males – legs slightly apart.
- Females – legs apart and knees flexed.
- Scrub up and wear sterile gloves.
- Paint the area with Pyodine solution, avoiding the anus.
- Isolate the area using sterilized sheets.
- Instill lignocaine gel through the urethra.
- Wait for 3-5 minutes.
- With the help of an assistant the catheter covering should be removed by no touch technique.
- Check patency of the balloon.
- Holding the catheter tube in plastic covering which is sterilized, the tip of the catheter is lubricated with lignocaine gel.
- The catheter is then introduced through the external meatus with a gentle push.
- Once the catheter is pushed in full length, urine flow will start. If not, then inject normal saline to check the patency and normal placement of the catheter before inflating the balloon.
- The balloon is then filled with normal saline according to the amount mentioned on the balloon channel (usually 10cc).
- The catheter is pulled back gently until the inflated balloon stops further pulling.
- Secure the catheter and attach drainage bag.
- Remove gloves, dispose equipment appropriately and wash hands.

- Document size of the catheter inserted, amount of water in the balloon, patient's response to procedure and assessment of urine.

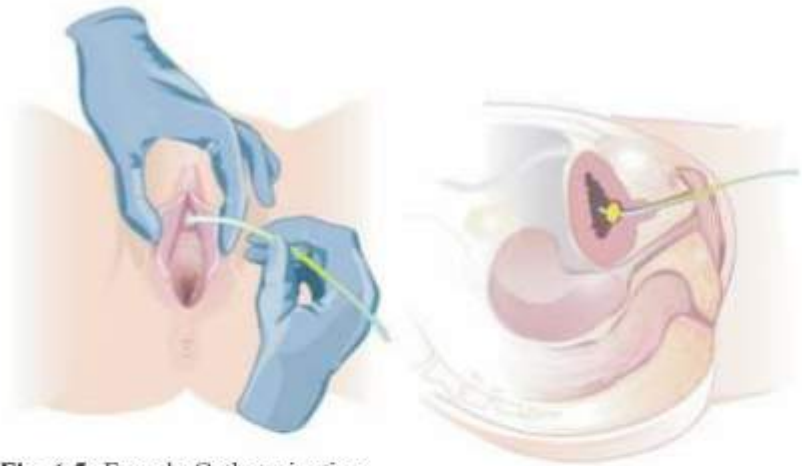


Fig. 6.5: Female Catheterization

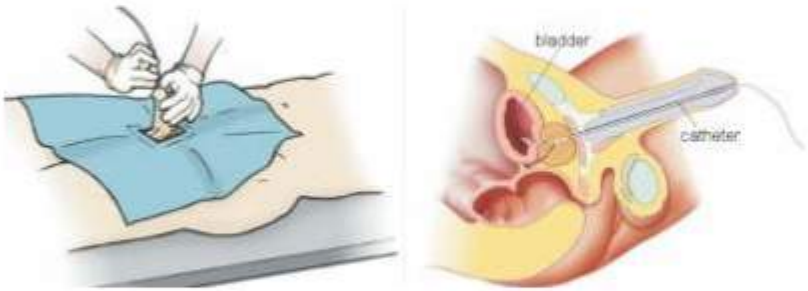


Fig. 6.6: Male Catheterization

Removal of catheter:

- The catheter can be removed in two ways:

o Attach a small syringe to inflation port on side of the catheter, draw out all the fluid in the balloon and slowly pull out the catheter till its removal.

o Cut the inflation port tubing before it reaches main tubing of the catheter. After all the water is drained from the balloon, slowly pull out the catheter.

Complications and problems:

- If the catheter is not gently inserted, it can cause urethral injury
- Inflation of the balloon inside the urethra can lead to injury to or

rupture of the urethra

- Infection may be introduced if proper no touch technique is not observed or if catheter is left inside for too long
- When acute retention is relieved, decompression can cause bleeding from the bladder mucosa – to avoid this, procedure for slow decompression should be adopted.
- While removing the catheter, if the balloon is not completely emptied it may rupture and the fragments will then have to be removed from the bladder.

Repeated catheterization may result in stricture formation.

SESSION 7

ASEPTIC TECHNIQUES AND SURGICAL INSTRUMENTS

Essential resources and equipment:

- Pyodine scrub
- Wash basin

Objective:

- To remove dirt and, as much as possible, decrease the bacterial flora on the surgeon's hands and arms

Prerequisites:

- Before scrubbing, the surgeon's nails should be neatly cut and clean.
- Personnel should remove all jewelry and must already be wearing appropriate OR (operating room) attire: caps, masks, and shoe covers.
- Depending on the availability of assistants, the surgeon often opens a sterile towel pack, gown and gloves before scrubbing

Scrub Procedure:

- Total scrub time should be at least 5 minutes.
- Open scrub solution pack.
- Avoid getting scrub suit wet.
- Wet hands, arms, and elbows.
- Hold arms upright so water always drains away from fingertips towards elbows.
- Wash both hands with sponge side of brush.
- Use plastic nail cleaner under each fingernail.
- Rinse and reapply scrub solution with sponge.
- Using circular motion, scrub all fingers as if each had 4 sides.
- Scrub back of both hands and palms.
- Proceed to scrub each arm in the same manner, starting at each wrist and working step-by-step down to both elbows (staying at the same level on each arm) and do not return to a scrubbed area.
- Add water as needed to produce lather.
- Rinse each hand and arm, starting at the fingertips, remembering to hold hands higher than elbows.
- Dry with sterile towel using opposite ends of towel for each arm. Start drying at fingertips and proceed to elbow; do not return towel to re-dry an area.
- Hold hands above elbows and avoid touching nonsterile objects.
- Put on sterile surgeon's gown and gloves.

7

GOWNING

Objective:

- Infection prevention

Procedure

- Pick up the sterile towel that has been wrapped with your gown (touching only the towel) and proceed as follows:
- Dry one hand and arm, starting with the hand and ending at the elbow, with one end of the towel. Dry the other hand and arm with the opposite end of the towel and after that, drop the towel.
- Pick up the gown in such a manner that hands touch only the inside surface at the neck and shoulder seams. Take care not to contaminate the gown on unsterile equipment whilst opening.
- Allow the gown to unfold downward in front of you.
- Locate the arm holes.
- Place both hands in the sleeves.
- Hold your arms out and slightly up as you slip your arms into the sleeves.
- Another person (circulatory) who is not scrubbed will pull your gown onto you as you extend your hands through the gown cuffs. (Fig.7.1)

GLOVING

- Open the inner glove packet on the same sterile surface on which you opened the gown.
- Pick up one glove by the cuff, using your thumb and index finger.
- Touching only the cuff, pull the glove onto one hand and anchor the cuff over your thumb.
- Slip your gloved fingers under the cuff of the other glove. Pull the glove over your fingers and hand, using a stretching side-to-side motion
- Anchor the cuff on your thumb. With your fingers still under the cuff, pull the cuff up and away from your hand and over the knitted cuff of the gown.
- Repeat the preceding step to glove your other hand.
- The gloving process is complete. (Fig.7.2)

1. DRY HANDS.

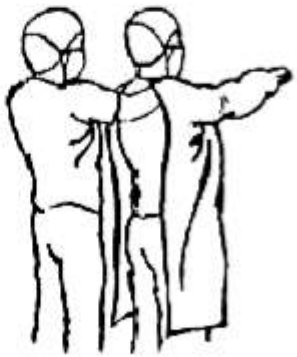
2. PICK UP GOWN.

3. LET GOWN UNFOLD.

4. OPEN TO LOCATE SLEEVE / ARMHOLES

5. SLIP ARMS INTO SLEEVES.

6. HOLD ARMS OUT AND SLIGHTLY UP



7. CIRCULATOR PULLS GOWN ON

Fig. 7.1: Gowning Procedure

7

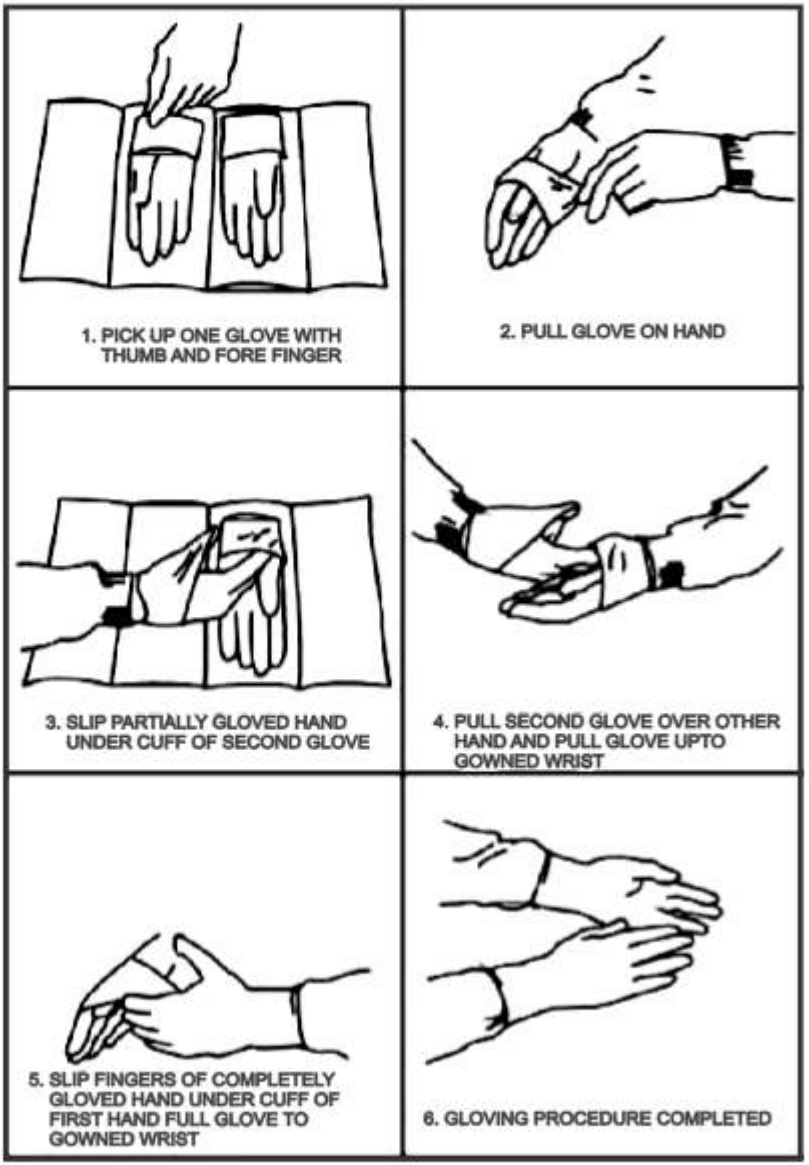


Fig. 7.2: Gloving Procedure

INTRODUCTION TO SURGICAL INSTRUMENTS

SCALPEL

Parts:

- Blade
- Handle

ASSEMBLY OF THE KNIFE

- Distal broad part of the blade is held with hemostat, from the non-cutting side, negotiated and put over the groove of the handle, by sliding over.

REMOVING THE BLADE

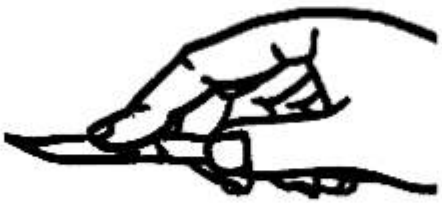
Knife is passed from one member of the surgical team to the other in two ways.

1. Handle first
2. Keep the knife in a kidney dish which is then passed on.

HANDLING OF KNIFE

Knife is held in the hand as per its use:

1. For cutting skin and similar tissues, knife is kept almost horizontal with the surface. It is held between the thumb and middle finger. Ring and little fingers wrapped around the middle to reinforce the control.
2. For precision work, the knife is held like a pen and gripped with the thumb, index and middle fingers. Surface to be cut is stabilized with the fingers and thumb of the other hand and the incision is made away from that hand.



Scissors

Types of scissors

Scissors are typed according to their:

Shape

- Straight
- Curved
- Angle

Size

- Small
- Medium
- Large

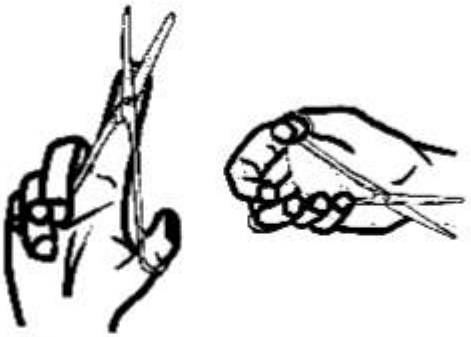
7

Tip

§ Sharp
§ Blunt

Handling

§ Thumb and ring finger are introduced into the rings of the scissors.
§ Middle and little fingers are curled around the distal ring to stabilize and the index finger is kept over the joint of the scissor.
§ It is stabilized with the index finger of the other hand while cutting the sutures.
§ Handling of scissors in right hand while cutting the tissue from left to right.



Dissection forceps

Types of dissection forceps

Dissection forceps are typed according to their

Size

· Small
· Medium
· Large

Tip

· Toothed
· Non-toothed

Ends

· Sharp
· Blunt
· Oval ring
· Angled

Handling

§ Forceps are held like a pen in between the thumb, middle, and ring fingers.
§ Use
§ Toothed forceps are used to grasp the skin and firm tissues
§ Non-toothed forceps are used to grasp delicate structures like the gut.

Hemostat or Artery Forceps

They are meant to hold the bleeding ends of the vessels and have scissors-like joint with ratchet lock and spring steel handles.

They are typed according to their:

Size

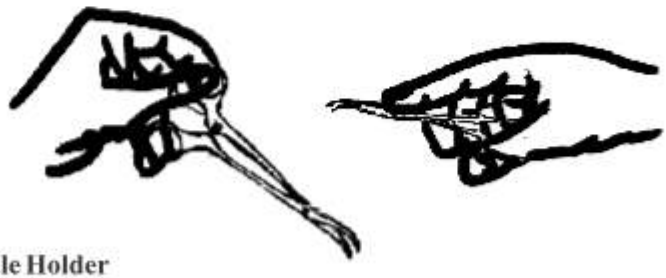
- § Small
- § Medium
- § Large

Shape

- § Straight
- § Curved

Handling

- § It is held with the thumb and ring finger in the rings
- § It is stabilized with the index finger over the joint with the other fingers around the distal ring.
- § Releasing of the artery forceps needs more pressure to unlock. The rings are pressed together then lifted and opened.



Needle Holder

- § They are held just like a hemostat.
- § The needle is grasped with the needle holder at the junction of its proximal 1/3rd and distal 2/3rd from the swage end.
- § To reverse the needle while it is still within the needle holder using dissection forceps requires the supination and pronation in the opposite direction of each hand.

7

Gripping a suture needle with a needle driver

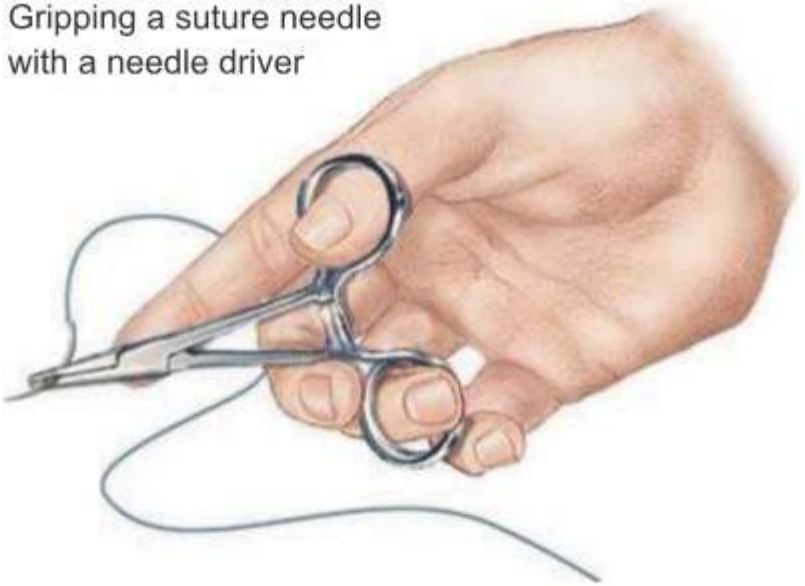
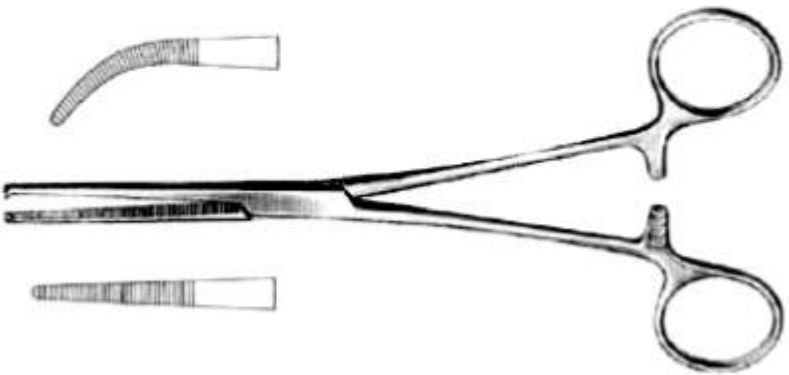


Fig 7.3: Handling of a Needle Holder

Kocher's Haemostatic Forceps

It is a toothed variety of haemostatic forceps, having a single sharp tooth at its tip. It is used to hold the retracting cut ends of the vessels in tough fibrous tissues such as in palms, soles and scalp.



Langerbeck's Retractor

It is a retractor with a small solid blade and a long handle. It is used for retraction of skin edges or big vessels and nerves.

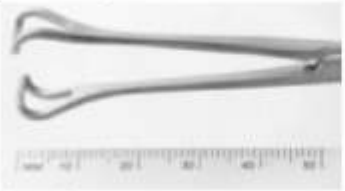
Deaver's Retractor
It is a large type of retractor with a broad, gently curved blade. It is mainly used for retracting intra-abdominal visceras.

Allis Tissue Forceps
The blades are straight along its long axis and are separated by a space except at the tip. This is used to hold this but tough structures for the purpose of giving traction onto these structure e.g. for holding skin, deep fascia, rectus sheath etc.

Lane's Tissue Forceps
The blades are curved, thicker, and fenestrated. It is used for holding tough and bulky tissue.

Babcock's Tissue Forceps

It is a non-traumatizing type of tissue forceps. The blades are curved and fenestrated. It is used to hold soft and tubular structures like appendix, fallopian tubes, and ureters. Etc.



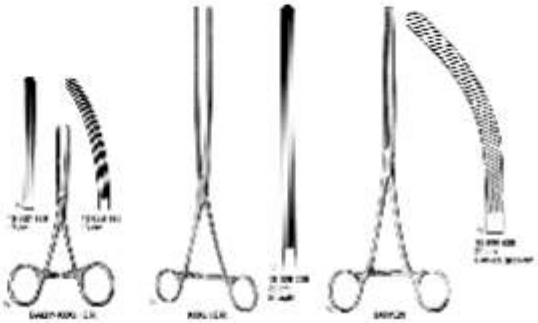
Intestinal Clamps

Intestinal clamps are large soft retaining forceps with a primary function to occlude the bowel lumen.

- Types
- o Crushing type (Kocher)
- o Non crushing type (Doyen)

Uses

- Non-crushing gut clamps are used for obliterating the lumen without devitalizing the ends to prevent spillage and reduce bleeding from the gut margins.
- Crushing clamps are applied on either side of the devitalized tissues (part of gut to be removed before resection of that segment).

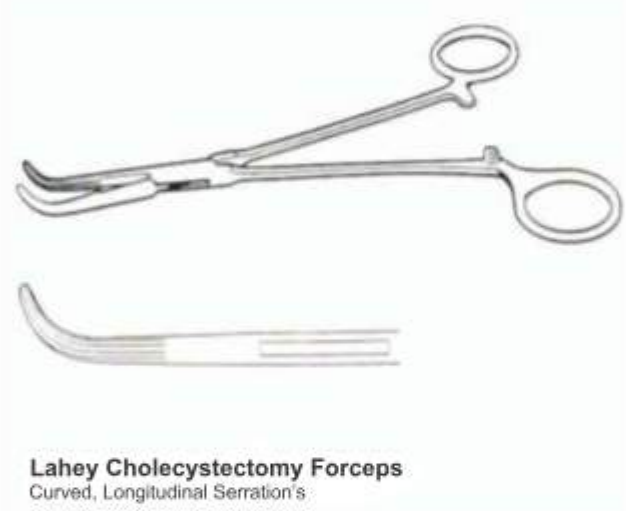


Morris Retractor

It is a large strong retractor with anteroposterioly-curved blades. It is used to retract strong structure like abdominal wall and musculature.

Cholecystectomy Forceps

This instrument has short angled blades with transverse serrations on their inner surface. The tips of the blades are pointed so that it can be easily negotiated around the cystic duct and vessel.



Lahey Cholecystectomy Forceps
Curved, Longitudinal Serration's

Desjardins' Forceps

This instrument has long, gently curved shafts. Blades are small and fenestrated. It is used to remove stones from CBD.

7

Fistula Director

It is small thin instrument made up of malleable material. It is used to lay open the fistulous tracts.

Bone Cutter

It is a strong instrument with sharp blades, which cut a bone.

Potts Bulldog Clamp

It is a paper clip like instrument with large strong jaws. The handle of this clamp is spring loaded. The jaws may be covered with tubing to prevent crushing of the vessels. It is used to clamp the large vessels during any surgery on the or for accidental bleeding from these vessels.

SURGICAL SUTURES AND KNOTS

SESSION 8

Absorbables

Catgut

Made of first quality raw material, Catgut ensures a dependable and predictable absorption and an extremely high tensile strength. Every strand is precision polished to a uniform diameter, permitting smooth and secure knotting. Available in plain and chromic.

Polysyn™/Polyglycolic Acid

The extraordinarily smooth, low friction proprietary coating reduces tissue drag. These synthetic absorbable sutures ensure closure through the critical wound healing period. They retain approximately 50% of their high initial strength at two weeks and 20% of their strength at three weeks. Available as undyed or violet braided and violet monofilament.

Non-Absorbables

Monofilament Nylon

The monofilament Nylon is a polyamide suture with characteristic high tensile strength. The uniform smooth surface permits easy passage through tissue. Available in black, blue and clear.

Braided Silk

Noncapillary Silk has excellent handling and tying characteristics. Modern braiding technique provides a uniform smooth surface and a greater tensile strength. Available in black and white.

Polypropylene

Inert, smooth, and easy to handle and knot securely, Polypropylene is our most versatile monofilament suture. Tensile strength is superior to other true mono-filaments. In addition, a unique extruding technique ensures a uniformly round cross section and a strand that passes easily through tissue with better knot security with less throws.

Fig 8.1 Types of Surgical Suture Materials

Fig 8.2 Suture material in their packing as seen in general operative settings

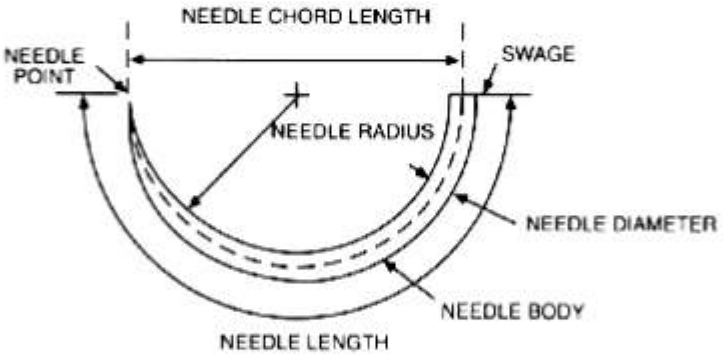


Fig 8.3 Anatomy of the suture needle

SURGICAL KNOTS

- Reef knot
- Granny knot
- Surgeon's knot

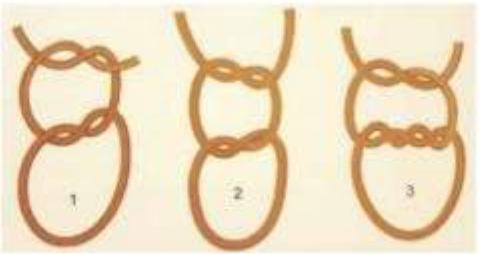
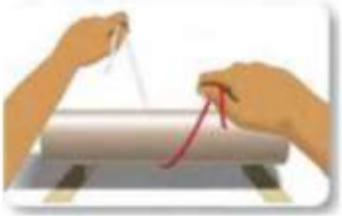


Fig 8.4: Types of Knots

TWO HANDED REEF KNOT

STEP 1
Prepare the cardboard tube and strap it to the tabletop or working surface using masking/sticky tape



STEP 2
Slip the string underneath the cardboard tube with the colored end towards you (near side), and the white end away from you (far side).

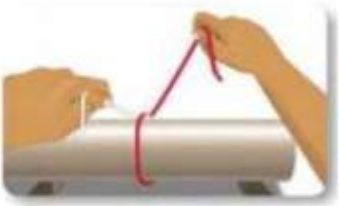
STEP 3
Left the open palm of your left hand face you. Bring the white end from the back and let it come over the index finger, cross the palm down to the little finger. Close the bottom 3 fingers around the white string, while maintaining an extended index finger.

STEP 4
Hold the colored strand in your right hand between your right thumb and index finger. Bring the colored strand forward and let it cross over the white strand (and thus over the left index finger).

STEP 5
Let the tips of the left thumb and index finger touch to enclose the two stands of string. Keep holding the colored end with your right thumb and index finger.

STEP 6
While keeping the tips of your left thumb and index finger touching, rotate these fingertips away from you, moving your thumb under the two stands and into the loop.

STEP 7
Place the colored end, currently in your right hand, between your left thumb and index finger, and let to of it with your right hand. Rotate your hand back to the starting position, bringing the colored tip through the loop.



STEP 8
Pull the white section towards you with your left hand and the colored end away from you with your right hand, thereby tightening the first throw of the knot.

STEP 9
Let the open palm of your left hand face towards your right-hand side. Make a V-shaped opening between your left thumb and index finger, and pull the white tip over the thumb into the "V" with the free end hanging down the palm past the little finger. Hold the white tip in the palm of the left hand by closing the bottom three fingers. The hand is held in a position almost as if pointing a gun.

STEP 10
With the right hand, bring the colored strand toward you, and place it between the left thumb and index finger, crossing over the white strand. Place the index finger of your left hand over the colored section and touch the tip of the left thumb - enclosing the two strands.

STEP 11
Rotate these fingertips downwards and towards you. The left index finger goes under the two strands and into the loop. Take the colored tip held by the right hand, and place it between your left thumb and index finger while releasing it from your right hand.

STEP 12
While maintaining your grip on the colored end between your left thumb and index finger, rotate your left hand back allowing the left thumb and index finger to carry the colored strand through the loop. Grip the colored strand between your right thumb and index finger and release it from the left hand.

STEP 13
*Loosely tighten the knot by moving your left hand holding the white tip away from you and your right hand holding the colored tip toward you - thereby completing the second throw of the square knot.

**If you tie the knot too tightly you might not be able to untie the knot for re-using the rope!*

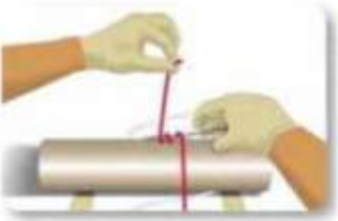
INSTRUMENT TIED KNOTS

STEP 1
Slip the string under the cardboard tube with the colored section towards you (near side), and the white tip away from you (far side). The white section should be shorter than the colored section.

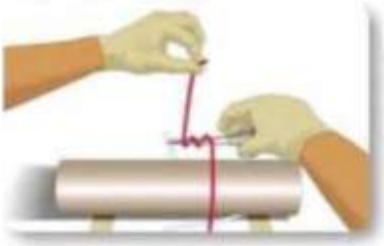
STEP 2
Hold the needle holder in your right hand

STEP 3
Place the needle holder parallel to the cardboard tube with the tip pointing to the left hand side. The latch mechanism of the needle holder must be disengaged at this stage.

STEP 4
Hold the colored section on the near side between the thumb and index finger of the left hand.



STEP 5
The colored section of the string is brought from the near side, over the needle holder, down and back to the near side - thus making the first loop. Repeat this maneuver again (the string is brought from the near side, over the needle holder, down and back to the near side) - wrapping the string around the needle holder a second time.

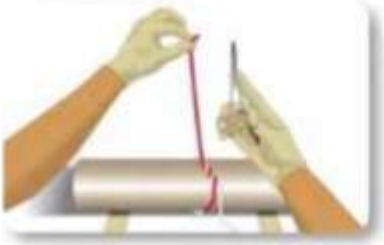


STEP 6
Open the jaws of the needle holder and grasp the white section on the far side, close to the tip of the string. Engage the ratchet latch mechanism.

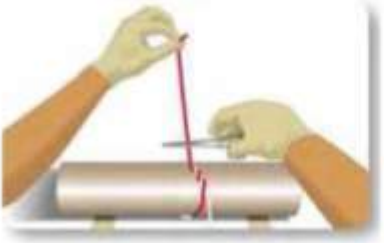
Step 7a

Step 7b

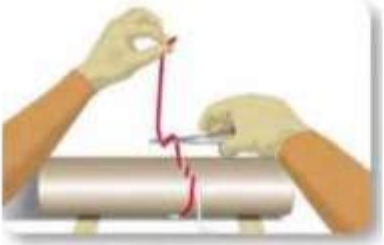
STEP 7
Pull the white section towards you using the needle holder and the colored section away from you using your left hand. Tighten the knot - thus completing the first throw.



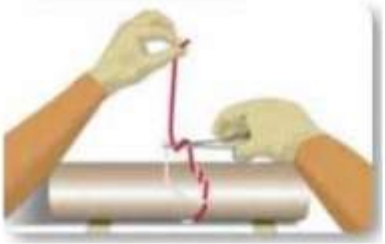
STEP 8
Unclip the latch of the needle holder and release the white tip.



STEP 9
Place the needle holder again parallel to the cardboard tube with the tip pointing to the left hand side. Hold the colored section on the far side between the thumb and index finger of the left hand.

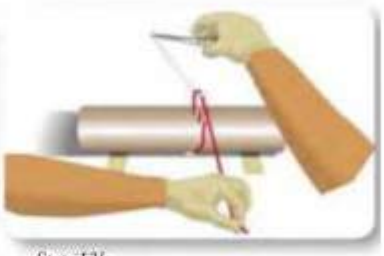


STEP 10
The colored section of the string is brought from the far side, over the needle holder, down and back to the far side - thus making the second loop.



STEP 11
Open the jaws of the needle holder and grasp the white section (now on the near side) close to the tip of the string. Engage the ratchet latch mechanism.

Step 12a



Step 12b

STEP 12
Pull the white section away from you using the needle holder and the colored section towards you using your left hand. Tighten the knot - thus completing the second throw.

STEP 13
Unclip the latch of the needle holder and release the white tip.

Knot Tying At Depth

- Adequate length of thread is needed.
- First half of the hitch is made outside the cavity (either single handed or double handed)
- One end of the thread is pushed with hitch in the cavity, either with finger or with instrument.
- The other end of the thread is kept taut by traction.
- The same procedure, in reverse direction, is applied a second time and the knot is tightened to complete the second hitch.

Surgical Sutures

- Interrupted suturing
- Continuous suturing
- Vertical mattress suturing
- Horizontal mattress suturing
- Subcuticular continuous suture

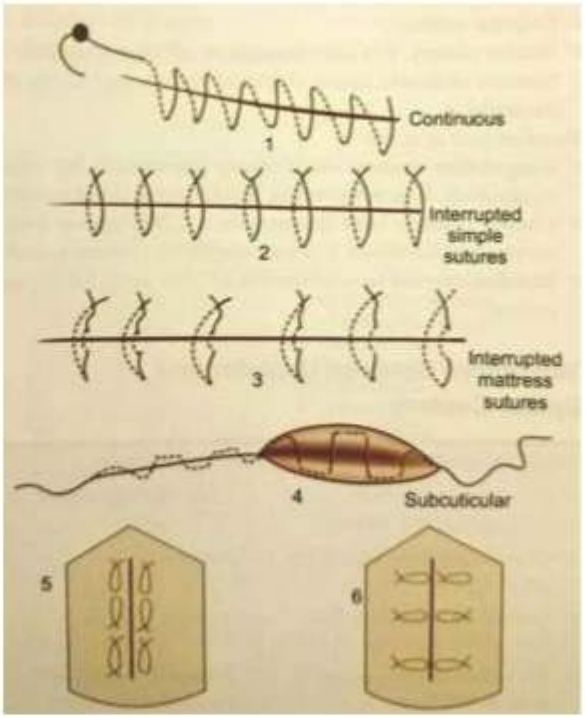
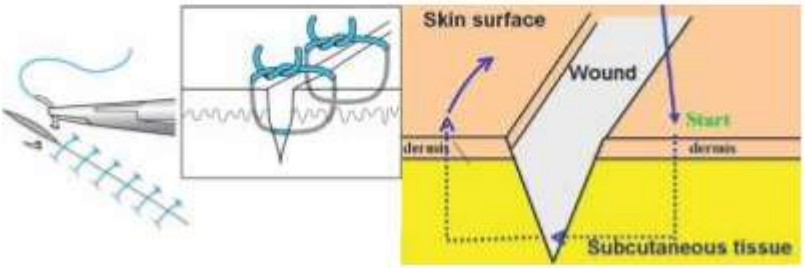


Fig 8.5 Types of Surgical Sutures

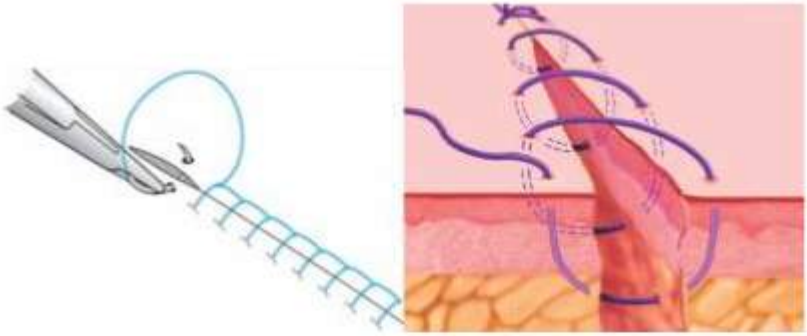
Interrupted Suturing:
The distance between each stitch should be at least twice the depth of the wound.

- Edges are to be approximated in slightly everted manner.
- Width and depth of the sutures on both sides of the wound should be equal.



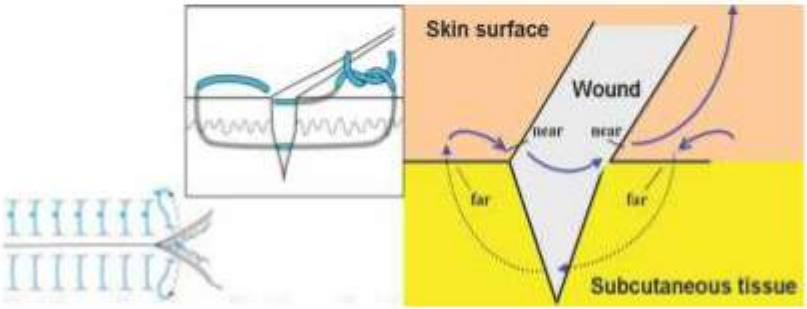
Continuous Suturing:

- Same principles as is applied for interrupted sutures except for continuous stitching.
- Aberdeen knot maybe applied at the end of suturing.



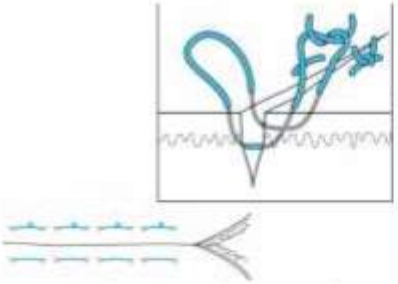
Vertical Mattress Suturing:

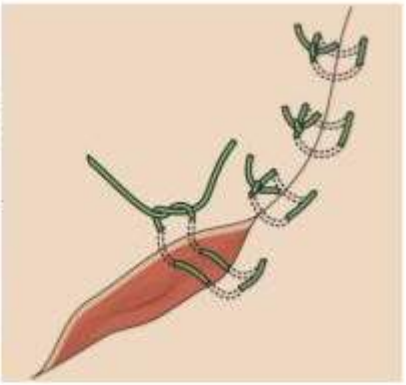
- These are applied to keep the skin edges everted when the wound is irregular or the surfaces are unequal and varying in depth.
- The mattress is made in the same line.
- The suturing is started at a distance from the wound margin and is brought out from the other side of the wound at the corresponding point, 1cm away from the margin.
- The needle is then reversed in needle holder.
- Needle is then passed through the very edge of the wound in the same line and taken out through the same point through opposite edges of the wound.



Horizontal Mattress Suturing

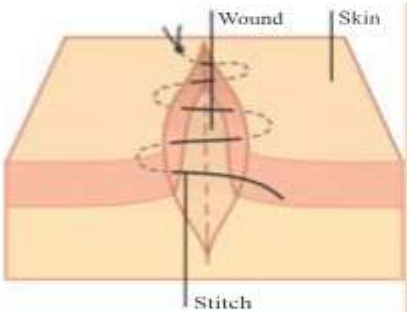
- These are special sutures where the suture material is brought at one place and reinserted after a short horizontal step, at an equal distance in the reverse direction, so that the larger part of the skin is approximated.
- The open part of the sutures is visible on either side of the wound in a horizontal fashion.

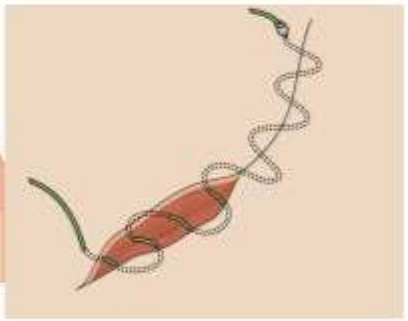




Subcuticular Continuous Suture:

- Here the stitches are applied in the dermis on either side in a continuous manner.
- Each suture enters at the exact corresponding point on the opposite side.
- At the end of the wound the suture is taken out from the skin.
- It is then passed through the same exit point in the opposite direction two or three times. Alternatively, a bead can be applied following which crushing bead is passed and crushed with bead clamp.





SESSION 9

DIGITAL RECTAL EXAMINATION & PROCTOSCOPY

Objectives:

- To identify any lesions present in the anorectal region
- For estimation of tonicity of the anal sphincter. Ability to distinguish between any abnormal and normal anal sphincter tone
- To check for growths or enlargements of the prostate gland in men.
- To check for pathologies in female reproductive organs, such as the uterus and ovaries
- To help find the cause of symptoms such as rectal bleeding, pelvic pain, change in urination or change in bowel habits.
- Check for hemorrhoids or other growths in the area.

Resources and Equipments:

- Disposable gloves
- Lignocaine gels
- Screen for the privacy of the patients
- Light source

Steps of Procedure

- Inform the patient about the procedure
- Relax the patient and assure him of his privacy.
- Ask the patient to relax by breathing deeply.
- Ensure adequate privacy and uncover the patient from waist to the knees.
- Position of the patient

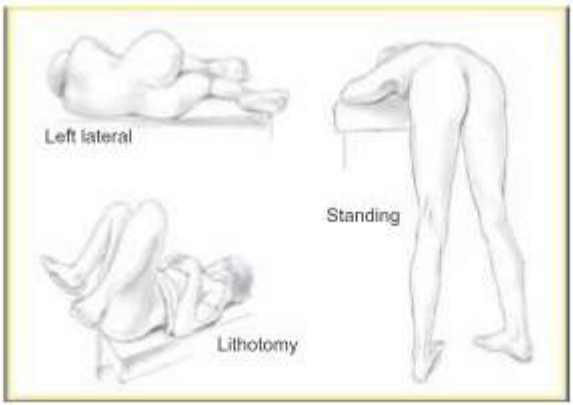


Fig. 9.1 Patient Positions for Digital Rectal Examination

- The patient should lie in the left lateral position with his neck and shoulders rounded so that his chin rests on his chest, hips flexed to 90° or more, but knees flexed to slightly less than 90°.
- Properly illuminate.
- Put on sterilized gloves.
- Lubricate your index finger with a lubricating jelly.
- Part the buttocks and inspect the anus and perineum.
  If a fissure is present the DRE should be avoided as it is very painful for the patient. It can be identified as a narrow tear extending from the muscles to the anal canal.
- If no fissure is present, place the pulp of your right index finger on the center of the anus, with the finger parallel to the skin of the perineum and in the mid-line.
- Press gently into the anal canal and at the same time press backwards against the skin of the posterior wall of the anal canal and underlying sling of puborectalis muscle. DO NOT INTRODUCE THE TIP OF THE FINGER WITH THE NAIL POINTING IN THE ORIFICE. (Fig 9.2)

Fig. 9.2

- Palpate all the walls of the rectum. Lateral wall palpation will detect any pelvic pathology. Anterior wall palpation will detect any lesions in the pelvic viscera like bladder, uterus (in females), and prostate (in males). (Fig. 9.3)

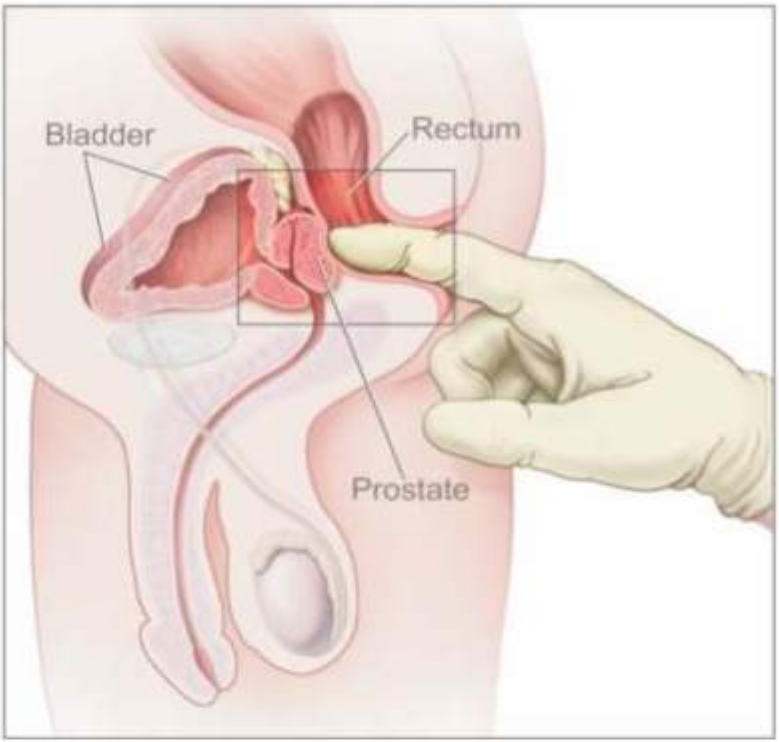


Fig. 9.3 Palpation of all rectal walls

- After through examination, remove the finger and examine for any blood stains, mucus, faecal matter, etc.
- After examining the anal canal and the rectum, remove the gloves and place your hand on the abdomen and examine the contents of the pelvis bimanually.

PROCTOSCOPY

Objective

- Localize, identify, and photograph pathological alterations in the lower part of the rectum and anal canal; such as tumors or polyps, inflammation, bleeding, hemorrhoids
- Obtain biopsy material
- Perform other surgical interventions, such as injection sclerotherapy of hemorrhoids.
- Delivery of medication

Resources and Equipments:

- Proctoscope
- Rectal biopsy forceps
- Disposable gloves

- Lignocaine gels
- Screen for the privacy of the patients
- Light source

Fig. 9.4 Proctoscope

Procedure

- Inform the patient about the procedure.
- Take consent.
- Make the patient relax and assure privacy
- Have a proper light source
- Position of the patient
  - o Knee elbow position
  - o Left lateral position
- The instrument is well lubricated, held with the dominant hand, and introduced in the direction of the anal canal (Fig 9.5)

Fig. 9.5 Positioning of the Proctoscope

- The outer core of the proctoscope has a handle and a visualizing metallic tube. Handle is gripped in the hand with the index finger stabilizing the visualizing core with the obturator in it.
- The proctoscope is gently introduced towards the umbilicus. When is through the anal sphincter it is directed towards the posterior wall of the pelvis. (Fig. 8.3)
- After the introduction, the obturator is removed and with the proper light source the mucosa is inspected.
- The mucous membrane of the rectum is examined for the presence of abnormalities such as inflammation, ulceration, any growth.
- The speculum is slightly withdrawn and the mucous membrane of the anal canal will be seen protruding through the speculum.
- Hemorrhoids are sought, their position and number noted.
- Biopsy of the rectal mucosa can be taken.
- Proctoscope is removed.

Fig. 9.6 Impacted matter being removed on Proctoscopy

Complications:

- Injury to the anal sphincter or mucosa
- Bleeding from existing hemorrhoids
- Pain

SESSION 10

LAPAROSCOPIC SURGERY

Instruments/equipment

- TV Monitor
- Microchip Camera
- Telescopes either 0 or 30 degrees
- Fiber optic Cable
- Xenon or halogen light source
- Automatic Insufflators: provide carbon dioxide for producing pneumoperitoneum.
- Instruments, Ports 10mm & 5mm.
- Hassons cannula for open technique.

Fig 10.1 Laparoscopic Instruments

Creation and Maintenance of a Pneumoperitoneum

Close Technique:

- Incision of about 1 -1.5 cm is made. Incision is infraumblical, vertical (transverse or circumlinear).
- After incising skin and subcutaneous tissue, linea alba is displayed.
- At the level of linea alba, lift the abdominal wall with the towel clip and puncture it with Veress needle
- Veress needle has protective blunt spring tip and has a valve to control the gas flow.

- When Veress needle is pushed into the peritoneal cavity sudden give away is felt.
- Free movement of needle is checked by rotating it all around.
- Veress needle entry into abdominal cavity can be confirmed by a Water test and Drop test.

Water test: Fill a 10cc syringe with normal saline and attach it to the needle. First suck the air and then push the saline inside. There should be free flow in both directions.

Drop test: A drop of saline is put on the end needle and abdominal wall is lifted, the saline drop will slide inside abdomen.

Open Technique:

- Incision is similar to the open technique.
- After applying stay sutures on both sides of mid line linea alba is divided with vertical dissection in midline.
- Peritoneum is then held between two forceps and divided.
- Finger is inserted inside the abdominal cavity to separate adhesion with the abdominal wall.
- Under direct vision blunt tipped Hassons canula is inserted.
- To prevent air leakage stay sutures are tightened around the metal port.
- Carbon dioxide is then insufflated into the peritoneal cavity and distributed equally in all four quadrants which is confirmed by percussion.
- There should be no resistance to flow of carbon dioxide. Initial rate is 1L/min then raised to 3L/min.
- Abdominal pressure is maintained between 12-14mmHg.

Insertion of port:

- After lifting the abdominal wall with two towel clips, 10mm trocar is introduced into the abdominal cavity.
- Direction of the tip of trocar and force should be toward the pelvis.
- Where is feeling of give way. Remove the trocar and lower the port inside.
- Open the Louver lock.
- Free entry of carbon dioxide into the abdominal cavity confirms position of the port in side the abdominal cavity.
- Introduce Laparoscope to rule out any damage done to the viscera.
- Rest of the ports are inserted under vision.

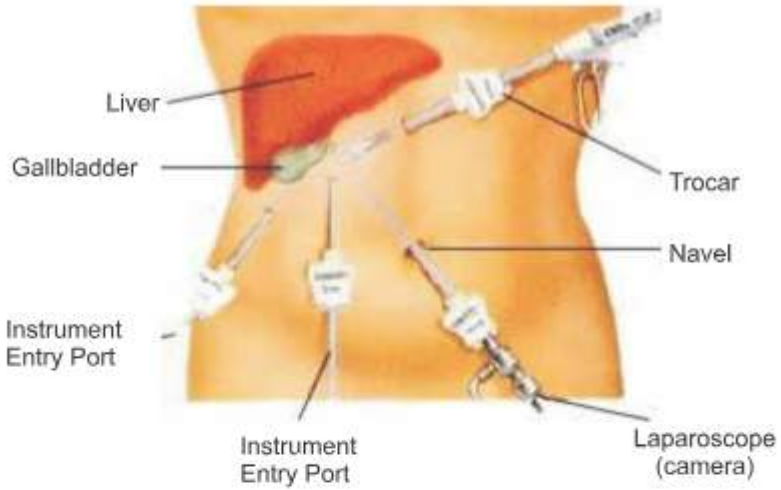


Fig 10.2 Placement of Laparoscopic Ports

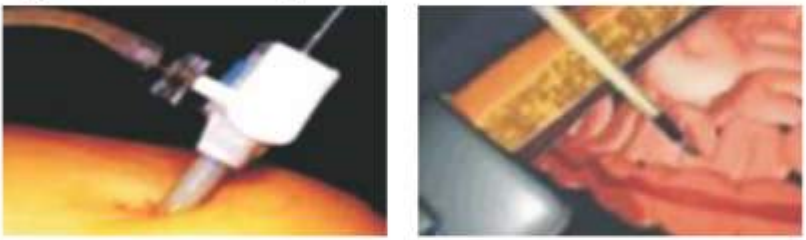


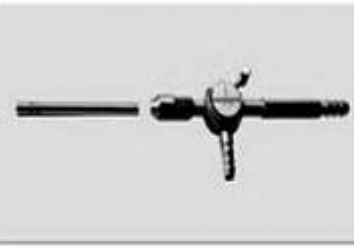
Fig 10.3 Ports on the outside and inside of the abdominal cavity

Laparoscopic Instruments:

FKL831 10x400mm
Cuide probe

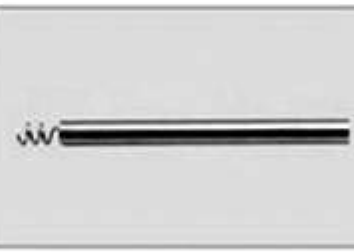
15mm, 20mm
Dilator

FKZ050210 5x400mm
Tubal Grasping Forceps



FQL715 5x330mm 10x330mm
Suction Irrigation

FQL802 5x400mm
Palpation Probe



FKZ803 10x400mm
Womb Tumor Drill

15mm, 20mm
Trocar Sleeve

FKL803
Easy Use Manipulators

SESSION 11

BANDAGES AND MANAGEMENT OF FRACTURES

Objectives:

- To cover injured tissues
- To cover and support injured joints
- To support dressings or splints

Essential resources and equipment required:

- Roller bandages

a) Gauze (open weave material) bandage
b) Elasticized bandage
c) Crepe bandage

- Triangular bandage
- Tube bandage

Fig 11.1 Types of Bandages

Methods:

To apply a roller bandage:

- Keep the rolled part of the bandage above the injury and unrolled part below the injury.
- Make two straight turns in the bandage to hold the end in place.
- Work up the limb, unwinding the bandage from inside to the outside in spiral turns making sure that each new turn covers one third to two thirds of the previous one.
- Finish with one straight turn and secure the end of the bandage,

To apply bandages to elbows and knees:

- Flex the joint slightly, apply the bandage in a figure of eight and extend the bandage quite far on each side of the joint.

To apply bandage on hand:

- Work from the inside of the wrist using diagonal turns across the back of the hand to the end of the little finger, leaving the thumb free.

To apply a triangular bandage as a sling on an arm:

- Ask the patient to hold their arm across their chest and support the arm while you work.
- Put the bandage under the arm and around the back of the neck.
- Put the other half of the bandage over the arm to meet at the shoulder and tie into a knot.
- Tuck the lose ends of the bandage in at the elbow or use a pin.

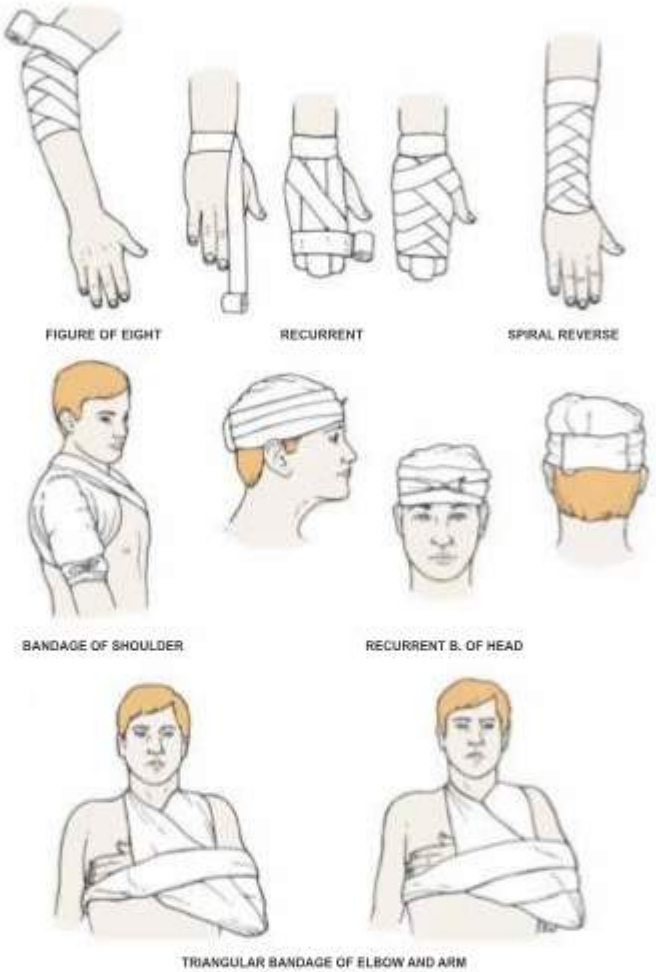


Fig 11.2 Application of bandages on different areas

Complications:

- Ischemia due to pressure.

POP APPLICATION

Objectives:

- Splintage of undisplaced fractures
- Pain relief
- Prevention of complication at the site of injury

Essential resources and equipment:

- Pop bandages

- Cotton roll
- Disposable gloves
- Apron
- Examination couch
- Branula
- Disposable syringes (5cc)
- Pain killer injection
- Big water bowl
- Bowl stand
- Slings – different types

Procedure:

- Make the patient comfortable.
- Educate the patient regarding the need and time duration of the pop cast.
- Patient should be pain free.
- Ask the patient to lie on the couch.

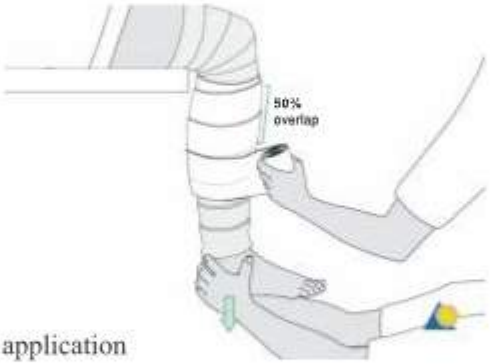


Fig 11.3 POP application

- Hold the fractured extremity comfortably and gently in anatomical position.
- The joints (proximal and distal) to be held in the position of application of pop cast.
- Apply the cotton in thin layers, wrapping the extremity and padding the bony prominences.
- Dip the pop bandage in water at 25°C.
- Hold the pop bandage from the sides.
- Let the water trickle out.
- Do not squeeze the bandage over the applied cotton.
- Apply 6-12 hours layers — as needed.
- Mould the cast.
- Round the edges.
- Let it dry for 5-7 minutes.

- Apply the sling if needed.
- Clean the extremity.

Complications:
- Swelling
- Discoloration
- Pain
- Numbness
- Pressure ischemia
- Muscle atrophy

General Management of Fractures
Objectives:
- To reduce pain and discomfort
- To adequately splint/stabilize the fracture
- To reduce mortality and morbidity
- To prevent soft tissue injury

Essential resources and equipment:
- Emergency tray
- Equipment for I/V cannulation
- Trauma care equipment
- Trained trauma team
- Trained paramedical staff/ nursing staff
- Pop application equipment
- External fixator system
- Slings/splints/collars etc.
- Skin/skeletal traction equipment

Outline of general management:
- Transport the patient properly with minimum mobilization
- Follow the ATLS guidelines
- Take help of trauma team when needed
- Get I/V access, make patient pain free
- Identify the fracture/dislocation
- Take appropriate radiographs
- Stabilize open/intra-articular joints
- Apply slings/splints/tractions/pop/back slabs – whichever suitable
- Shift the patient to orthopedic department for definitive management.

Initial difficulties in management:
- Altered level of consciousness
- Hemodynamic instability
- Inadequate initial X rays
- Critical condition of the patient

FNAC AND TRUCUT BIOPSY

SESSION 12

FINE NEEDLE ASPIRATION CYTOLOGY

Objectives

- To obtain material for diagnostic cytological examination.
- It is most useful for breast neoplasm but is also an aid in the clinical assessment of thyroid, salivary glands, lymph nodes, and head and neck lumps, and with the use of a special needle, the prostate.

Essential Resources and Equipment for FNAC:

- Sterilized gloves
- Spirit swabs
- Band-aid
- Syringes- two for each patient (10cc BD Precision Glide are used. The recommended syringes are glass syringes with a piston to create negative pressure, with different length needles. For thyroid, breast, lymph node and salivary glands, 2.5-6 cm long needles are required)
- Clean glass slides with a spreader
- Fixative-ethanol is used to fix the smear

Fig 12.1 Equipment for FNAC

Technique

- Inform the patient about the procedure and take consent.
- Wash hands and wear sterilized gloves.
- Clean the area with spirit.
- Local anesthetic may be given.
- The handle of the syringe is held with one hand and with the non-dominant hand, the lesion is fixed.
- Insert the needle into the lesion and pull back on the syringe plunger, creating negative pressure

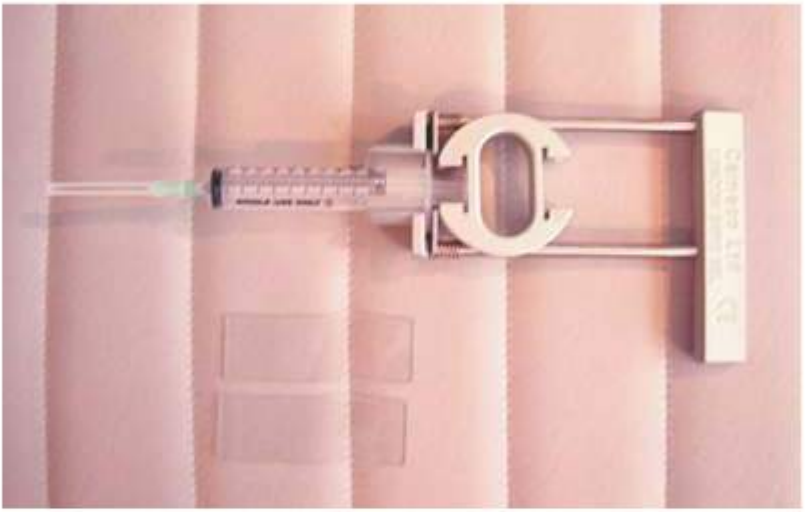


Fig 12.3 FNAC needle with plunger

- Make short 5 mm "in-and-out" motions until you see material coming into the hub of the needle.
- When you start to see material in the hub, stop, release negative pressure on the syringe, and pull out to make the slides.
- Do not aspirate material into the syringe or dilute with blood or saline
- If you do not see any material at all in the hub or syringe, continue the short 5 mm strokes until you have done 15-20 strokes
- Pull out and attempt to express material on the slides.
- Once the procedure is completed, a small dressing or some small tape will be placed over the FNAC site this can be removed the next day.
- The smears are air-dried and then fixed with ethanol and stained by Giemsa's method.
- Remove gloves, dispose off the equipment.

Complications

- Hemorrhage or hematoma can be seen at the site of aspiration.
- Infection can be introduced.

Other complications depend upon the body part on which the biopsy takes place:

- Lung biopsies are frequently complicated by pneumothorax.
- For biopsies of the liver, bile leakages may occur, but these are quite rare.
- Pancreatitis may occur after biopsies in the area around the pancreas.

TRUCUT BIOPSY (CORE BIOPSY)

Objectives:

- To confirm the diagnosis when a suspicious lump is found, for example a breast lump or enlarged lymph node, or if an abnormality is detected on an imaging test such as x-ray, ultrasound or mammography.

Equipment and resources:

- Trucut biopsy needle
- Injectable local anaesthetic
- Sterile gloves
- Pyodine scrub
- Antiseptic solution
- Scalpel
- Gauze dressing

Fig 12.2 Trucut Needle

Procedure:

- Explain the procedure to the patient and take consent.
- Make the patient lie down comfortably with adequate exposure of the site where the biopsy has to be taken from.
- Wash hands with Pyodine scrub and wear sterile gloves.
- Clean the area where the needle has to be inserted, with an antiseptic solution.
- Instill local anaesthetic at the site and wait till the area is numb.
- A small stab incision is made in the skin over the lump, and the needle is inserted through the incision.
- When the tip of the needle is in the area to be examined, the specially-designed hollow needle is used to collect a sample of the cells that are present.
- The needle is then withdrawn, and the sample extracted. This may be repeated up to 5 times, until an adequate sample has been collected.
- In some cases, the lump or mass from which the cells are to be taken is deep and not easily felt through the skin. If this is the case, the procedure can be carried out under ultrasound, CT or mammography guidance.
- Once the test is completed, a small dressing or some tape will be placed over the biopsy site. This can be removed the next day.
- Remove gloves, dispose off the equipment.
- The biopsy sample should be placed in an appropriate jar, labeled carefully and sent to the pathologist.

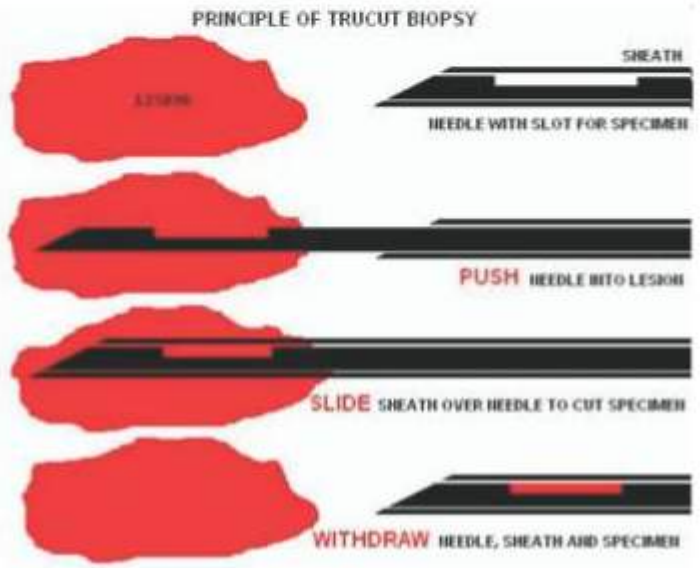


Fig 12.4 Trucut Biopsy Procedure

Benefits:

- It is quicker and less invasive than a surgical biopsy, so involves little possibility of scarring, infection or pain, and has a significantly shorter recovery time.
- Easier to interpret than a fine needle aspiration cytology.
- Can help to distinguish between some types of pre-cancerous disease (such as ductal carcinoma in situ) and invasive ductal carcinoma.

Complications:

- Generally no complications with this procedure, though one may experience some tenderness or bruising over the needle insertion site.

Risk:

- There is a possibility that any cancer cells present could be trailed into unaffected tissue as the needle is removed, but this is rare when the test is performed by skilled practitioners

SESSION 13

NORMAL VAGINAL DELIVERY AND EPISIOTOMY

Objective:

- Conduction of normal vaginal delivery under supervision.

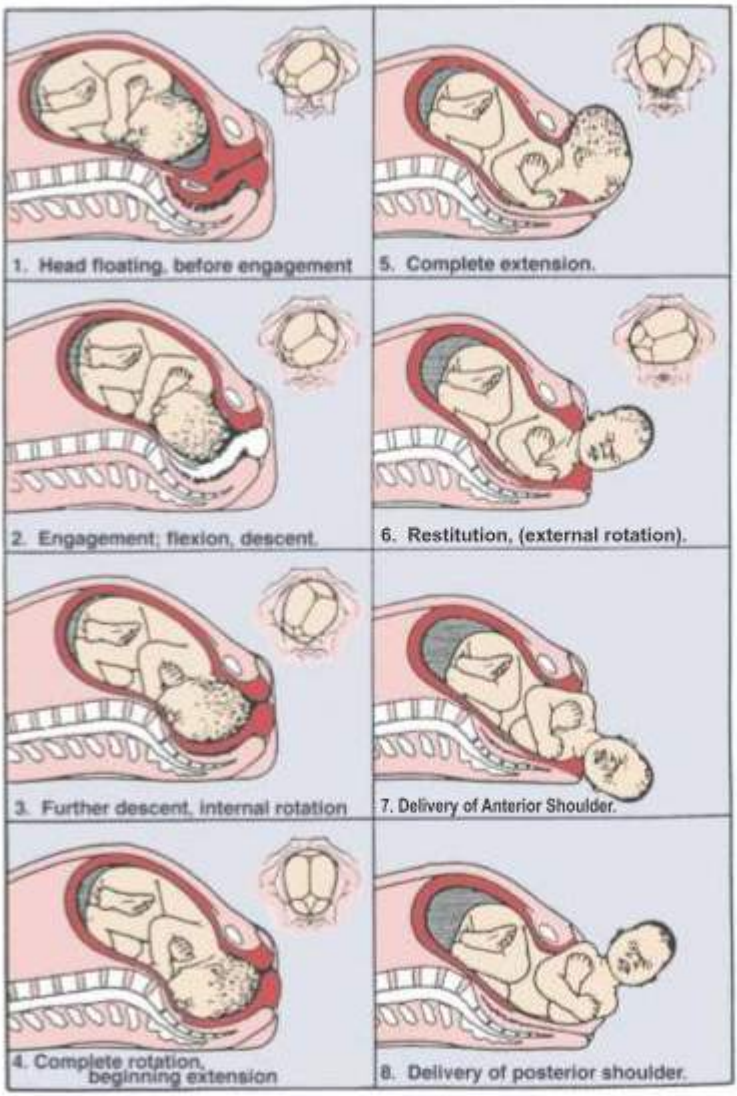


Fig 13.1 Physiology of Normal Delivery and Labor

Protocol of normal vaginal delivery:

- Shift the patient to the delivery room during the second stage of labor.
- Scrub with Pyodine, wear an apron and sterile gloves.
- Secure I/V line.
- Show sympathetic attitude towards the patient guide her.
- Clean and drape the patient with sterile sheets.
- Catheterize the patient if the bladder is full.
- Monitor fetal heart rate after every contraction.
- Ensure supervision by a senior resident.
- Episiotomy should be given at crowning of head, with adequate analgesia.
- Deliver the baby, clamp and cut the umbilical cord.
- Clean air passages by suction, assess APGAR score and hand over to the staff.
- 5 units of oxytocin I/V for active management of third stage of labor.
- Deliver placenta by Brandt Andrew's method.
- Check placenta and membranes to be complete, to avoid bleeding from retained placental tissue.
- Assess amount of blood loss.
- Stitch episiotomy in layers. Perform a digital rectal examination.
- Clean the patient and shift to the recovery room.
- Dispose off the gloves, remove apron and wash hands.

Episiotomy

An episiotomy is an incision through the vaginal wall and the perineum, to enlarge the vaginal opening and facilitate childbirth.

Objective:

- To enlarge the vaginal opening during delivery, while possibly preventing spontaneous vaginal tears of a greater degree than the episiotomy.

Indications:

- If the baby is premature or otherwise fragile, episiotomy can relieve some of the pressure on the baby caused by stretching the perineum.
- Prolonged second stage of labor
- Preterm baby, large baby
- Forceps or vacuum delivery
- complicated birth such as a breech presentation or shoulder dystocia
- fetal distress

Timing:

- In the late second stage, with the presenting part of the fetus at +3 station and perineum thin and stretched.

13

Types of Episiotomy:

- Median
- Mediolateral
- Lateral
- J shaped

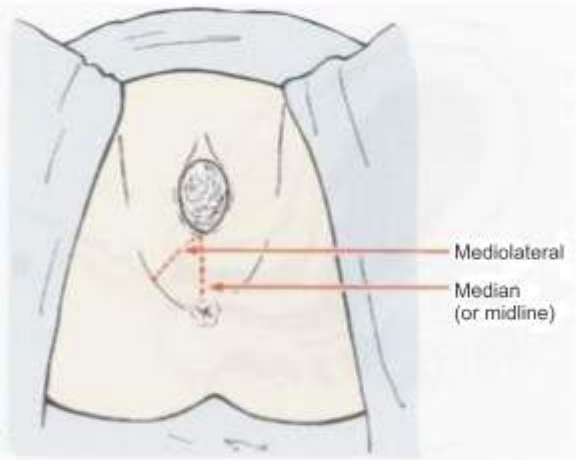


Fig 13.2 Common episiotomy positions

Method:

- Explain the procedure to the patient and answer any questions the patient may have
- Take consent.
- Wash hands with Pyodine scrub, wear sterile gloves.
- Clean and drape the area
- Infiltrate the perineum with 1% lignocaine solution
- The fingers of the left hand are introduced into the vagina to protect the fetus and stretch the perineum
- During the second stage of labor (pushing stage), with the presenting part of the head at +3 station, make a diagonal incision, across the midline between the vagina and anus (Fig. 12.1)
- Deliver the baby
- Deliever the placenta
- Examine the episiotomy incision for any further tearing

- Episiotomy Repair: done in three layers
- The incision in the vaginal mucosa is apposed by continuous suture beginning at the apex and continuing beyond the hymen to the mucocutaneous junction, where it is tied. This seals the mucosa and prevents seepage of fluids from the vagina into the perineal wound.
- Perineal muscle is then repaired with interrupted sutures, taking care not to include the rectum, inadvertently.

Perineal skin is repaired by interrupted sutures. Sub-cuticular stitches can also be applied commenting at the interior angle of the wound taking a wide bite laterally and narrower bite on the medial side to avoid the rectum.

Complications:

- Bruising
- Bleeding
- Swelling
- Infection – due to gaped episiotomy
- Incontinence (difficulty holding gas or stool)
- Dysparunea
- Vaginal Lacerations
- Hematoma

SESSION 14

OTOSCOPY

Objectives

- To Identify the Slides Showing Ear Pathologies

OTOSCOPE

It is the diagnostic medical instrument which is used to examine the external ear.

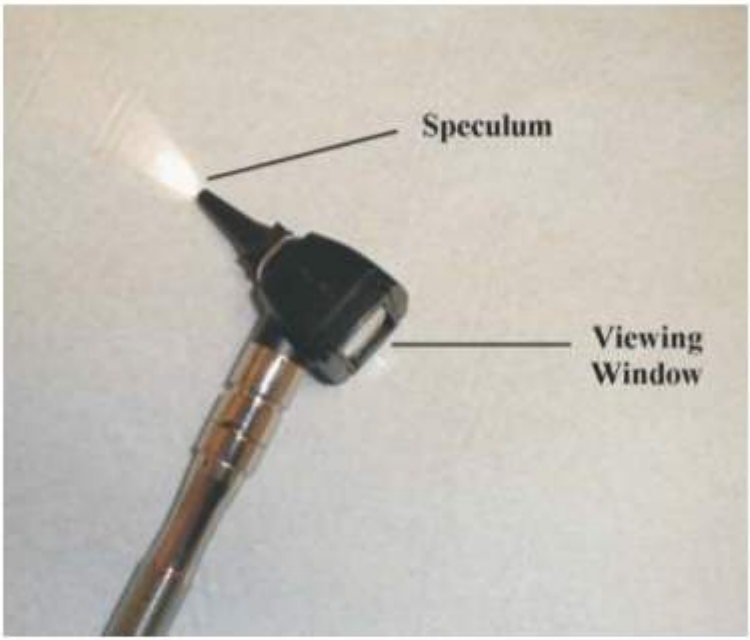


Fig 14.1 Otoscope

Parts of Otoscope:

1. Head: It has an attachment for ear speculum, light source and a low power magnifying lens.
2. Handle: for holding and positioning the otoscope.

Indications for the use of the Otoscope:

It is used for diseases of external and middle ear involving the tympanic membrane.

Steps of usage:

1. Straighten the ear canal by pulling the pinna
2. Insert the ear speculum of the otoscope into the external ear
3. Look through the lens on the rear of the instrument to see inside the ear canal

Fig 14.2 Positioning the Otoscope

14

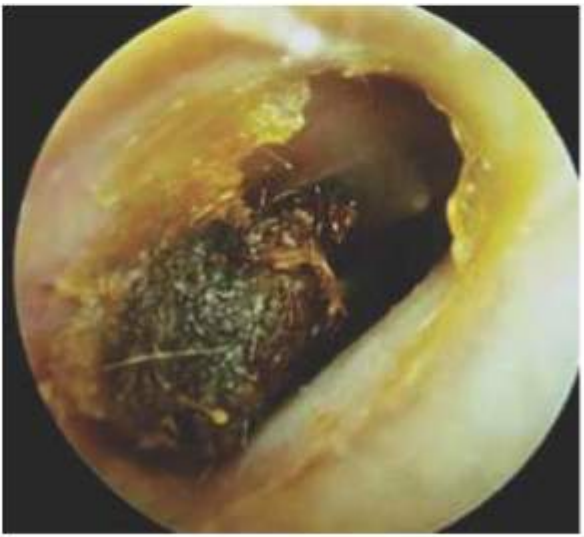
Objectives

- To Identify the Slides Showing Ear Pathologies

Normal Ear

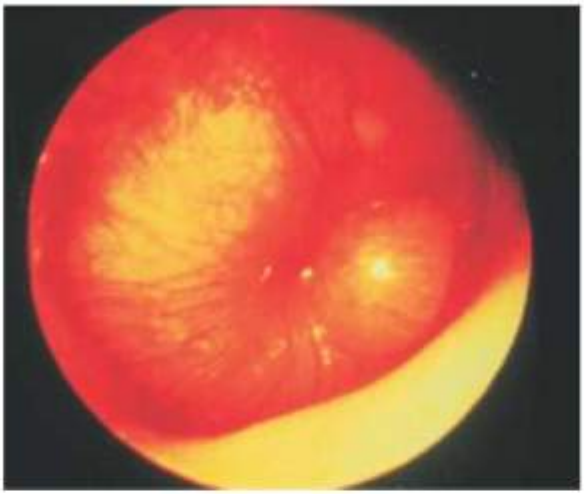
1. Normal tympanic membrane with pearly grey appearance
2. Long process of Incus

Wax or Cerumen



- Wax in the outer part of meatus
- Partially obscuring the drum
- Colour changes from pale yellow to golden yellow to black

Acute Otitis Media



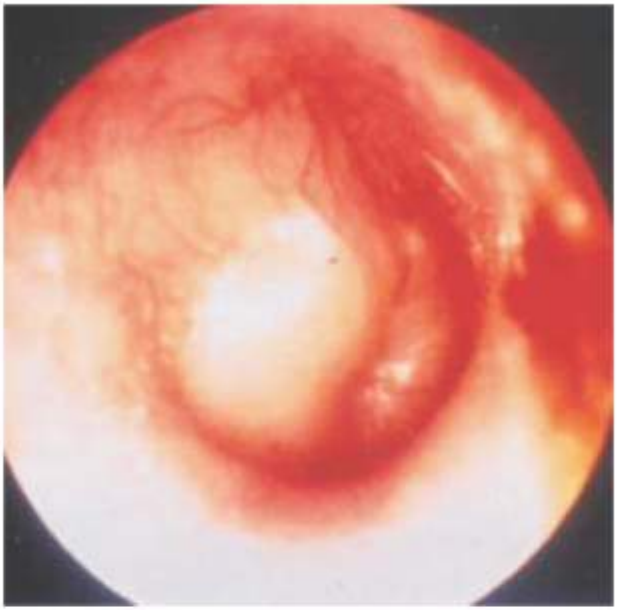
Bulging inflamed tympanic membrane with prominent blood vessels

- Two yellowish spot in tymapainc membrane depicting pus behind the drum

Further Example of Middle Ear Infection with Effusion

- Grossly retracted Tympanic membrane with fore shortening of handle of malleus
- Prominent lateral process of incus

Acute Otitis Media with No Recognisable Land Marks



- Bulging of ear drum (nipple stage)
- Loss of land marks of tympanic membrane

Appearance of Serous (Secretory) Otitis Media

- Retracted ear drum with no luster
- Prominent handle of malleus

Fluid Behind the Ear Drum in Asymptomatic Child

- Fluid level in lower half of ear drum
- Handle of malleus is difficult to visualize

Middle Ear Effusion

- Handle of malleus is still foreshortened and horizontal
- Tympanic membrane is retracted

14

A Further Example of Serous Otitis Media

- Indrawing of dull ear drum
- Handle of malleus is horizontal
- Eustachian tube obstruction resulting in vacuum formation and effusion of fluid

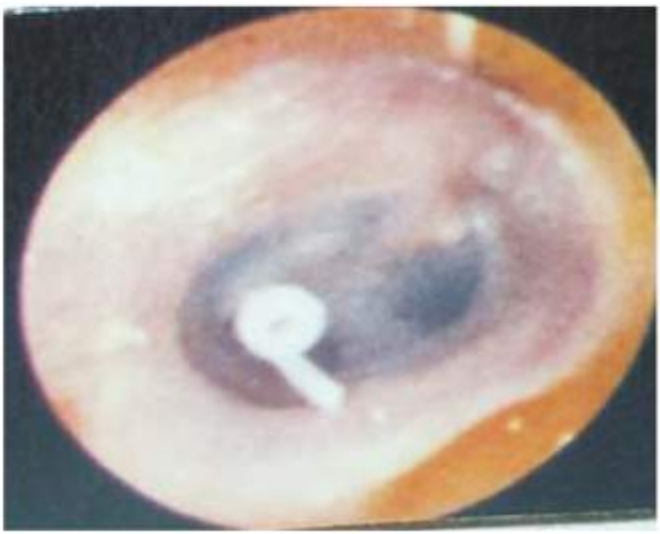
Tympanosclerosis

- Calcified plaques on the tympanic membrane as a part of healed otitis media

Central Perforation of Ear Drum

- Central perforation with rounded margins
- Long standing perforation accompanied by the tympanosclerosis of the drum

Grommet



- Silicon tube in an opening in the ear drum placed after myringotomy

SESSION 15

OPHTHALMOSCOPY

Objectives

- To identify positive findings in various diseases of the eye.

OPHTHALMOSCOPE

It is the diagnostic medical instrument which is used to examine fundus of the eye.

Fig 15.1 Ophthalmoscope

Indications:

Ophthalmoscopy is done as part of the routine physical and complete eye examination.

It is used to detect and evaluate symptoms of retinal detachment or eye diseases such as glaucoma.

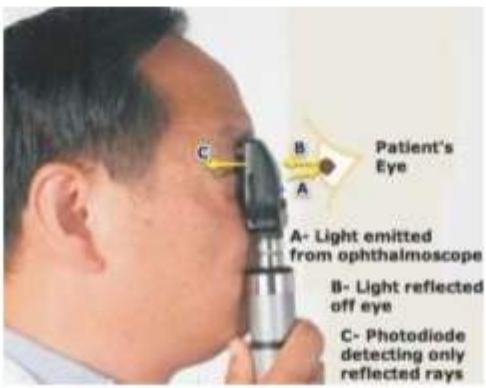


Fig 15.2 Physics of Ophthalmoscopy

How to use an Ophthalmoscope

Fig 15.3 Positioning an Ophthalmoscope

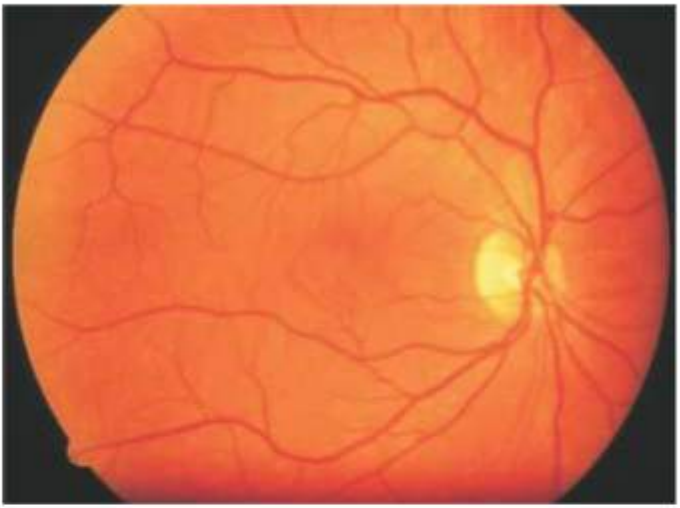
Hold the handle in hand and view through the bulb with lens close to the eye to be examined.

15

Objectives

- To Identify the Slides Showing

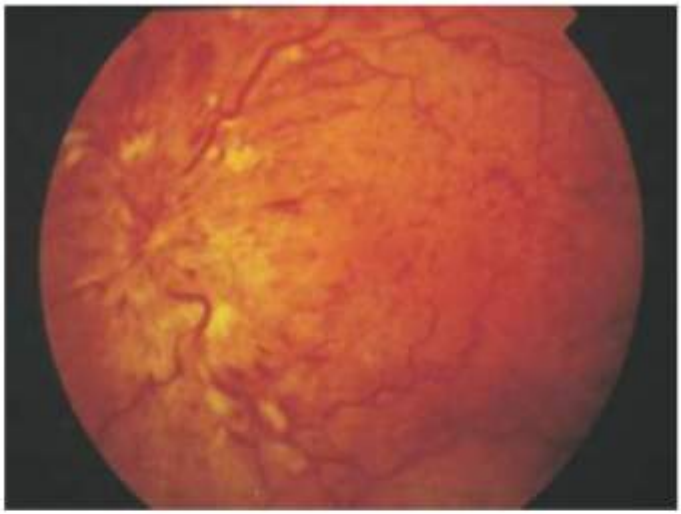
Normal Fundus



Senile Macular Degeneration (AMD)

- Disc is normal in appearance.
- Unusual pigmentation at the macula
- Drusens: Asymptomatic nodules occurring in the choroid

Central Retinal Vein Occlusion



- Typical "stormy sunset" appearance.
- Engorged veins with hemorrhages.

Hypertensive Retinopathy

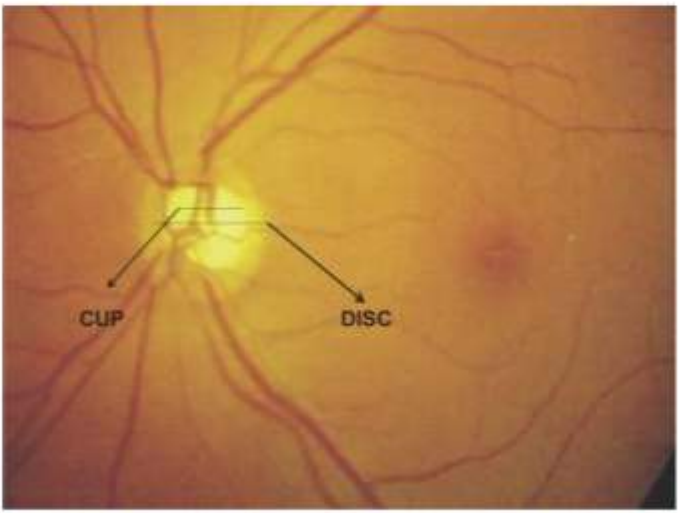
- Retinal arteries narrow and venous tortuosity.
- Hemorrhages and "star burst" exudates
- Optic disc oedema

15

Papilloedema

- Papilloedema in Bilateral condition
- Disc Margins blurred
- Swollen disc
- Congested veins

Optic Disc Cupping

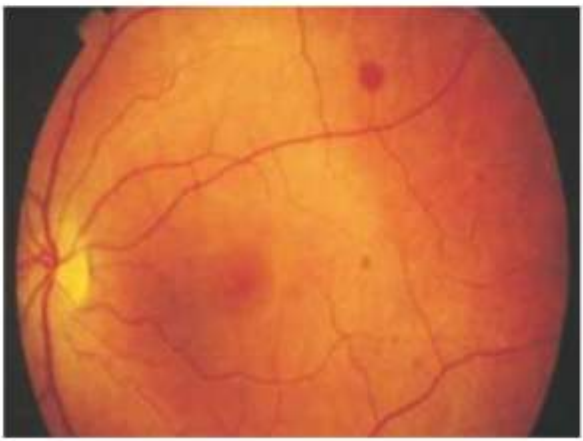


- Suggestive of glaucoma
- Cup wider and deeper
- Increased Cup-Disc Ratio
- Disc pallor

Optic Atrophy

- Disc pale
- Secondary to glaucoma, retinal damage, ischemia, poisoning.

Mild Back Ground Diabetic Retinopathy



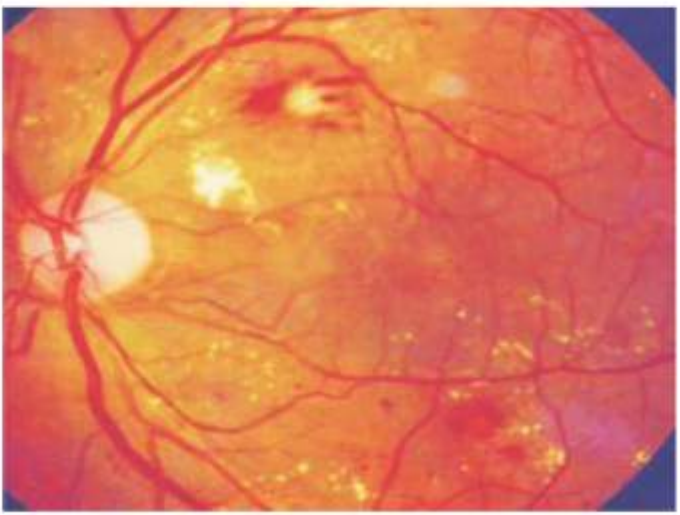
- Hemorrhages – larger red spots ,dot & blot
- Microaneurysm – smaller red spots

15

Back Ground Diabetic Retinopathy

- HEMMORHAGES = Red Spots
- HARD EXUDATES = Yellow Spots
- Maculopathy because macula is involved

Pre-Proliferative Diabetic Retinopathy

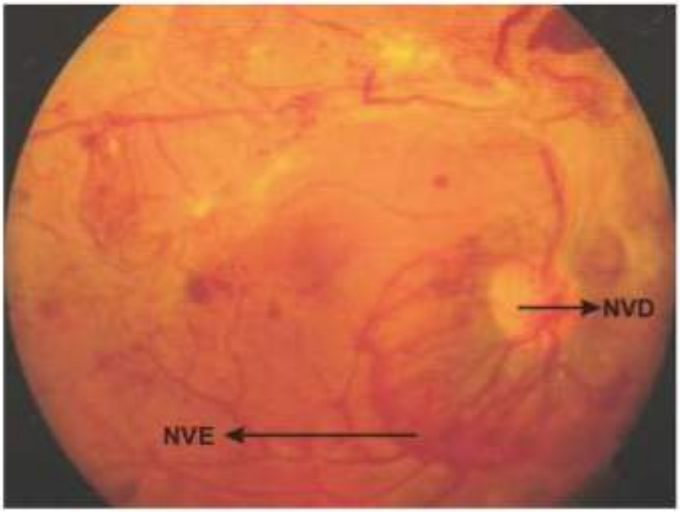


- HEMORRHAGES = Red Spots
- HARD EXUDATES = Yellow Spots
- Soft and Creamy white fluffy borders

Pre-Proliferative Diabetic Retinopathy

- HEMORRHAGES = RED SPOTS - retinal and viterous
- New Blood Vessels on the Optic Disc - NVD

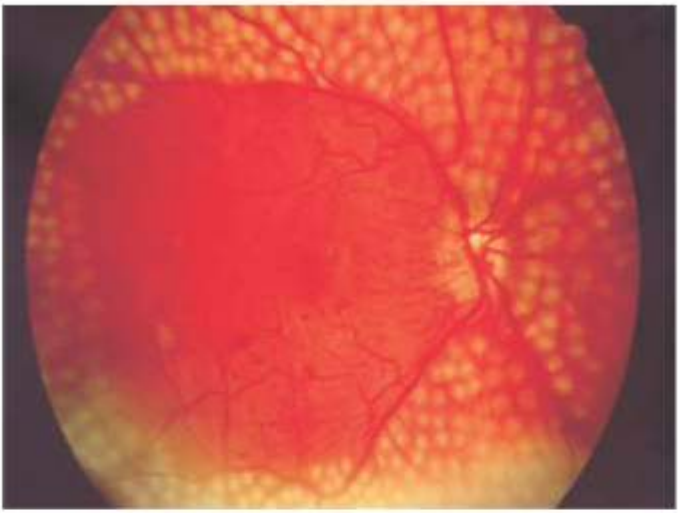
Proliferative Diabetic Retinopathy



- NVD = Neovascularization on disc
- NVE = Neovascularization elsewhere (on retina)

15

Diabetic Retinopathy



- Pan Retinal Photocoagulation (PRP)
- Sparing and preserving disc and macula

SESSION 16

SUBARACHNOID AND EPIDURAL SPACE ACCESS

Objectives

1. Aspiration of cerebrospinal fluid.
2. Institution of subarachnoid block.
3. Intrathecal injection e.g anticancer drugs.
4. Epidural injections e.g. local anaesthetics, steroids

Fig 16.1 Spinal Needle

Equipment

- Different needles e.g Quincke, Touhy, Whitacre.
- Syringes: 2ml, 5ml, loss of resistance syringe(LOR)
- Drapes
- Antiseptic solutions.
- Sterile gown and gloves
- Local anaesthetic and other drugs

Subarachnoid Space Access

Fig 16.2 Spinal Anaesthesia

- Informed written concent is required if to be done on real patient
- Either sitting or lateral position can be employed for this procedure. Young patients Fare better in lateral position.
- Aseptic technique requirements are the same as for any surgical procedure that is Painting with aseptic solution,gowning and gloving.
- Draw up drugs in different syringes:local anaesthetic for skin infiltration in 5ml Syringe and drug for local intrathecal injection in 2ml syringe to avoid syringe swap Problem.
- As dural tube usually ends at the level of L1 in adults,the preferred level for subarachnoid Block is between L2/L3 to L4/L5.
- Draw an imaginary line joining the highest point of iliac crest dorsally.This line will Cross spine of L4 or space between L4 or space between L4/L5.
- Infiltrate the skin of intended site with local anaesthetic
- Advance the spinal needle into the selected interspinal space while tip pf the needle is slightly cephalad.
- With experience one can feel the passage of needle through different tissues.
- Remove the stylet when tip of the needle is in subarachnoid space.
- Crystal clear fluid coming from the needle confirms the placement of needle tip in subarachnoid space.

Fig 6.3 Backflow of cerebrospinal fluid through a 25 gauge spinal needle after puncture of the arachnoid mater during initiation of spinal anaesthesia

- Rotate the needle through 360 degree and observe CSF flow through needle to confirm that The bevel of the needle is fully inside the subarachnoid space.
- Attach the syringe to the hub of the needle.Drug is injected after free aspiration of CSF.
- At the end of intrathecal injection ,before removing the spinal needle,free aspiration of CSF Confirms drug injection into the subarachnoid space.
- A small sterile dressing is placed on skin puncture site for 24hrs.

Epidural Space Access

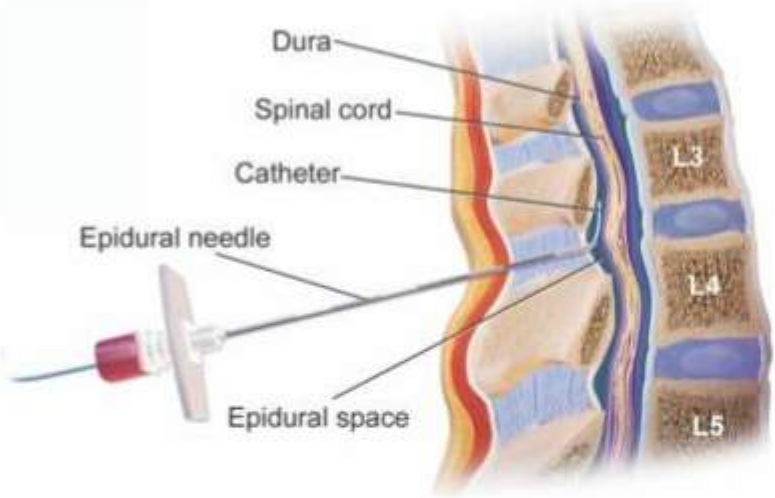


Fig 16.4 Epidural Anaesthesia

- After taking informed consent and observing aseptic measures,epidural space can be located. Either in sitting or lateral position.
- Epidural space can be approached from cervical region to sacral hiatus. Both midline and paramedian approaches have been described however paramedian approach is more useful for high thoracic epidural block. Steps to access lumbar epidural space employing midline approach and loss of resistance technique are as follows:

1. Paint with antiseptic solution and drape.
2. Infiltrate the skin with local anaesthetic using fine bore needle.
3. Insert epidural needle with stylet through skin and ligaments for a short distance while tip of needle is slightly cephalad.

4. Remove the stylet when tip is inside interspinal ligament (about 2 cm in average adult) and Attach loss of resistance syringe containing air or saline to the hub of epidural needle.
5. One cannot inject air or saline when tip of needle is within ligaments; keep advancing the needle while injecting air or saline.
6. The moment the tip of the needle pierces through ligamentum flavum (feeling of cutting through unripe apple) to enter the epidural space, the operator is able to inject air/ saline with ease immediately.
7. Calculate the depth by counting the markings (lee`s markings) on epidural needle.
8. Feed the epidural catheter through needle.
9. Attach the connector and filter to proximal end of epidural catheter.
10. Fix the epidural catheter on skin by opsite.